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NEWS IN BRIEF

ICL union gives in

UNION opposition to the closure of ICL's factory at Winsford has now collapsed completely, the local Joint Union Committee having accepted the inevitability of UPL's takeover of the plant with a statement wishing the new owners "every success".

Winsford staff have accepted redundancy and severance terms and are facing the prospect of joining others already on the dole in the queue for jobs when UPL starts recruiting, probably around Christmas.

NatSemi profits

FOR the half-year ended October 1980, National Semiconductor, the semiconductor components group and owner of National Advanced Systems, reports sales of all the group products up 40% to \$628 million. Profits for the half-year were \$33.4 million, up 41%.

US military comms

SPENDING on military communications systems in the US will total \$28.9 billion between 1980 and 1985, rising from \$3.8 billion in 1980 to \$5.4 billion in 1985, according to Frost & Sullivan's latest report on the subject, number 828. The US Air Force will spend the most and its largest project will be in space communications.

NCR made \$1bn

NCR FINALLY broke the billion-dollar barrier for turnover in the last quarter of 1980. The company reported turnover at \$1,084 million for the three months, 10% up on the closing quarter of 1979. This left turnover for the whole year up 11%, to \$3,322 million. Profit for the year as a whole rose 9% to \$254 million.

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COMPUTER WEEKLY

Minister calls for viewdata boost

A CAMPAIGN to boost viewdata and teletext was launched last week as Information Technology Minister Kenneth Baker called for a "combined and co-ordinated assault on the market by everyone concerned".

At a private conference on the future of viewdata and teletext, organised by the Department of Industry, Baker warned of the danger of letting the UK's lead slip away and the need to speed up the development of the home market if exports of the systems were to take off.

The conference steering committee would follow up ideas and proposals made at the conference and contact all the 80 participants in the next few weeks, Baker said. "It would aim to decide on a market strategy which the industry as a whole could accept and to which it could therefore commit itself wholeheartedly."

OTHER COMMERCIAL VIEWDATA AND TELETEXT INITIATIVES

Philips investigates residential user needs.....this page
Cheap, all-purpose terminal.....Computerview, page 2
Potential for US services.....page 6
Help for travel agents.....page 6
Voice input for Prestel.....page 6

NPL sets up technology transfer club

A COMMERCIAL speech recognition device using new techniques, and suitable for dealing with continuous speech, which was developed at the National Physical Laboratory, should be on the market within three years.

That is the prediction being made at NPL following the formation of a nine-member "club" of companies aiming to exploit the Laboratory's developments.

Among the members of the Speech Recognition Club are Ferranti, Plessey, Nixos, SDI, and Quest Automation. In return for their subscriptions of £8,000 a year they will receive information about NPL's work for incorporating in

their own products - "technology transfer arrangements", in the words of Dr David Schofield, the project manager. Individual confidential consultancy will also be available.

NPL considers it has made a breakthrough in its basic approach to speech recognition, quite different from those employed elsewhere. Instead of using pattern matching to look for words or phrases (the phonetic classification of parts of words) the NPL researchers are using special-purpose hardware to detect 16 different "speech features" which make up most of the vowels and consonants in speech.

A good year for CGS

FRENCH software giant CAP Gemini has reported impressive figures for 1980 which include a turnover up by more than 27% at £55 million and a 33% increase in net profit to £2.76 million.

But the company's UK interest, IAL Gemini, was hit badly in the industrial systems area, in the first full year since its formation, from the former wholly CGS-owned Gemini and the CGS-owned Gemini International Systems.

The general manager of IAL Gemini, Peter Clark, told Computer Weekly that turnover fell down from £400,000 in 1979 to £300,000 last year in the Machine

ter based industrial division. According to Clark, the other parts of the former Gemini operation, concentrating on commercial work like applications software for microcomputers and IBM terminals, were still buoyant. He said that the special systems operation, focusing on civilian command and control systems, was still doing well. Total IAL Gemini turnover for 1980 will probably come to about £1.8 million.

In 1980, the £238 million worth of CGS business came from the French company and the rest from its operations outside France, which now include a company in Norway (see Computer News).

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BAKER... Marketing efforts have so far been unco-ordinated.

Four towns figure in Philips' local study

IN concert with the government-initiated pull-together for viewdata, Philips has announced a trial promotion and investigation of residential user needs, to run for six months in a year.

The trial is to start in April in Brighton, Bournemouth, Harrogate and Norwich, and Philips is persuading other companies, including rival suppliers, to join in.

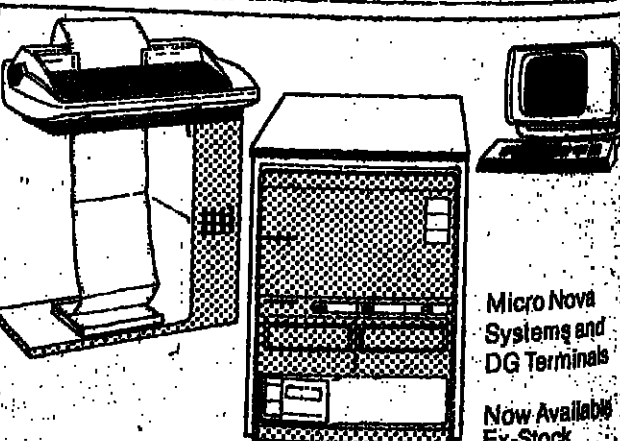
Philips plans to take a loss on terminals supplied to rental companies in those towns, to enable them to rent at rates close to the rate for a teletext receiver without making a loss themselves, but the main focus of the trial is to be to

find out what kind of information users would want Prestel for. Information providers which publish local information, such as Eastern Counties Newspapers in Norwich, are being asked to extend their databases to include things like bus timetables and supermarket prices.

Philips' viewdata marketing manager Julian Horn-Smith said some questions should be answered before the residential market builds up over the next two or three years, on what sort of package of price, information and selling method would satisfy user needs.

The hardware is as yet incomplete, and there are gaps in the expected data to be sufficient for the whole of England. This front-end hardware is entirely analogue, which is more suitable to the job than digital and would not have been possible until recently when analogue filter chips became available. The output from the pre-processor is fed to software in a Digital Equipment LSI-11, where searching for different words can be carried out in effect in parallel, so there is no need to detect the breaks between words.

Any device on the market in the near future would have to have a limited vocabulary of probably a few hundred words, Schofield says, so it could only be used for special applications. Key words could be searched for in continuous speech, but this searching could be done in real time, something that is not feasible at the moment.



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Banks come to ICL's rescue in short term

by Kevin Cahill

A £50 TO £100 MILLION rescue package based on short term bank loans is being assembled by ICL chairman Philip Chappell, say sources in the City. Citibank is believed to have offered \$50 million medium term finance on its own account.

The rescue package has become necessary following a dramatic fall in confidence among ICL's institutional shareholders after a series of unsuccessful meetings between Chappell and City stockbrokers.

The brokers and analysts claim that Chappell failed to answer any of the more pertinent questions put to him.

ICL has confirmed that the chairman will make a statement after the annual meeting next week.

The more pessimistic Citymen expect Chappell to reveal that the

company is trading at a loss.

The more optimistic hope he will reveal a recovery plan which is said to be in the course of urgent preparation.

This plan is expected to contain details of government backing, not necessarily in cash, for some or all of ICL's R&D programme.

Reshuffle

A major reorganisation of some of the company's operating divisions, with a board reshuffle, is also expected. Some sources say that the US operation is under active consideration for a sell-off following the collapse in 1980 sales there, and similar problems in the UK, with 1500, System 10 and 7500 machines.

Investing concern now centres on the fate of the large end of the 2900 range. Brokers feel that the company cannot become viable

without drastic surgery at this end of the range and Hitachi's confirmation that discussions did take place with ICL as recently as two months ago continue to arouse speculation about some kind of partnership or merger between ICL and a foreign partner.

Some analysts perceive that the company could achieve a significant degree of relief from cash flow pressure if enough destocking took place. The opportunities for doing this are limited if the top-end 2900 sales are as negligible as so far reported, and by the fact that the 7500 and 7700 range are still very short of software.

The possibility of an international trade embargo on South Africa, following the collapse of the Geneva conference on Namibia, will present ICL with an early opportunity to step up its sales there, even if the long term prospects are poor.

Corrigan sets up ULA plants

by Eileen Staines

UNCOMMITTED logic arrays (ULAs) have captured the interest of Wilf Corrigan, ex-chief executive of US electronics company, Fairchild. Having given up the position after the Schlumberger takeover, Corrigan plans to set up an initial ULA factory in Silicon Valley and a second in the UK in two to three years' time.

ULAs are a form of custom-built integrated circuit which drastically reduces the cost of de-

signing and manufacturing large scale integrated circuits for specialist applications, for example, where a standard microprocessor would be inefficient. They particularly suit telecommunications LSI device markets.

The plants will operate under a new company name of LSI Logic, which has already had funding worth \$500,000 from a UK firm, Technical Development Capital, part of the Finance for Industry group. Ten

other outside investors, mainly from California, have put in another \$52 million.

The UK plant will serve Europe, says Corrigan, and will join the production of ULAs already taking place in the UK at Reigate and Runcorn Microelectronics Systems. RMS recently signed an agreement with General Instrument to develop a silicon gate CMOS technology, known as the optimum technology, which will be used in future ULAs produced by RMS.

Burroughs' \$68 million loss

BURROUGHS, the second biggest computer company in America, made a loss of \$68,741,000 in the last quarter of 1980. This followed a special write-off of \$125 million relating to obsolete and returned machines.

Profit for 1980 as a whole was \$81,972,000, a drop of over \$223 million on 1979 profits.

Turnover for 1980 was \$2,902

billion, up just \$71 million on 1979 sales of \$2,830 billion.

The company, now headed by Michael Blumenthal, former Secretary of the US Treasury, has suffered a severe reverse in profitability, not only because of the equipment write-offs, of which more are expected, but also from a loss in customer confidence relating to some 400 lawsuits outstanding against the company. These are understood to relate to alleged failures in the company's B70 and B80 machines.

Despite the gloomy figures Blumenthal was optimistic about the company's future. He claimed that incoming orders created new records in 1980 and the year-end

in the longer term Palantype translation facilities could form an important part of electronic office systems, generating transcripts of a meeting, for example, as soon as it is over. But the accuracy of transcription with existing systems would normally be unsatisfactory for office use.

The real time system used for the Reagan speech generated

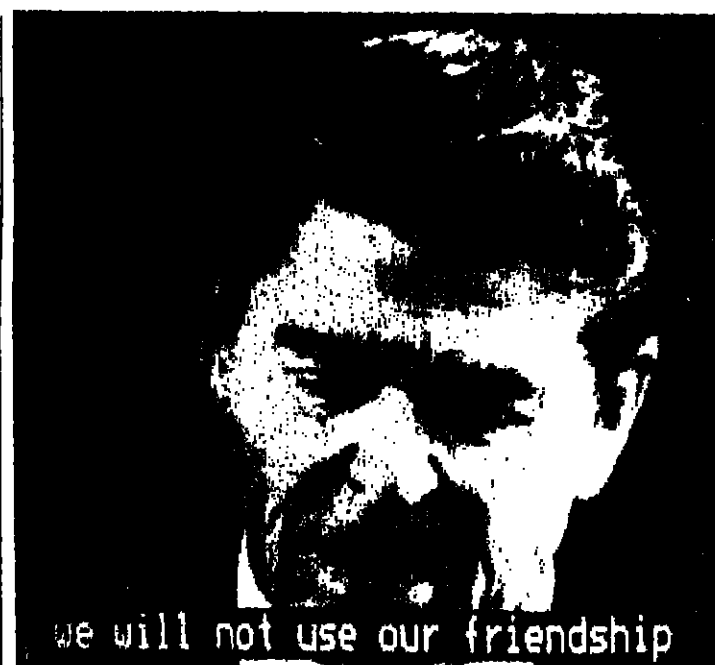
NHS ops call strikes

HEALTH Service computer staff throughout the UK are refusing to pay bills or operate accounting systems and will have a series of lightning one-day strikes in pursuit of their national re-grading claim.

This follows last Friday's breakdown of talks at a meeting of the Whitley Council, the body which decides pay in the Health Service. However, officials of the unions involved, Nalgo and NUPR, emphasise they would not take any action to put patients lives at risk.

The dispute has a 20-year history. When computers were introduced into the Health Service, DH staff were paid at similar rates to "clerical grades". But in 1975 Nalgo claimed that DH jobs were now paid at between £500 and £3,000 a year below the market rate. The unions put in a re-grading claim and a joint working party was set up on management's invitation.

Senior Bailey, West Midlands District Officer (Health) for Nalgo, said, "Our claim will cost £1,200,000 a year in full."



we will not use our friendship

While Ronald Reagan made his inaugural address in Washington on January 20, BBC Television viewers with Ceefax receivers were able to read subtitles of the speech simultaneously - a "first" in television history. Generated by a shorthand translation system developed at Leicester Polytechnic, the subtitles were far from perfect but were warmly welcomed by many deaf-viewers, according to the BBC.

First broadcast using captions from real time shorthand

by Keith Jones

REAL TIME continuous speech recognition by computer may still be "pie in the sky", but the translation of speech using shorthand transcription took a major step forward last week when Ronald Reagan's inaugural address was subtitled on the BBC's Ceefax teletext service simultaneously with the live broadcast.

As part of its efforts to provide deaf viewers with subtitles using Ceefax, the BBC has been sponsoring work at Leicester Polytechnic on a system that converts phonetically encoded syllables entered on an electronic Palantype keyboard into readable English words. Palantype is the proprietary shorthand system used in US courts of law for recording proceedings on a two-inch paper tape, normally with a mechanical keyboard.

In the longer term Palantype translation facilities could form an important part of electronic office systems, generating transcripts of a meeting, for example, as soon as it is over. But the accuracy of transcription with existing systems would normally be unsatisfactory for office use.

The real time system used for the Reagan speech generated

subtitles that were "not perfect by any means" according to one of the leaders of the project at the BBC, Bill Hawkins. But he added that letters from deaf people about them had been "very enthusiastic", indicating that most of the Reagan speech had been followed.

Developed on a Burroughs B6700 mainframe at Leicester, the Palantype translation system was trimmed down for the BBC to run on a Cromemco 22H microcomputer.

● Turn to page 8

Briefing

Soft 81 melts away

SOFT 81, the series of projected software shows across Europe run by European Conference Organisers, has been cancelled because of an internal break between ECO's partners.

"The break-up is not directly to do with the shows themselves," said Soft 81 organiser Robert Joseph, who has left ECO although still technically a director. "It was more a matter of differing views on business ethics."

Bomb attack

DAMAGE estimated at £90,000 was caused at a Thomson-CSF laboratory in Toulouse on Monday by a bomb set off by a self-styled "Laser" terrorist organisation. "Laser" is believed to be the name of a group associated with "Clodo", which specialised last year in wrecking computers.

Second customer

FOLLOWING the installation of an IBM compatible AS/9000 by Guardian Royal Exchange Assurance, a second customer has been picked up by National Advanced Systems for the 10 nips Hitachi-built mainframe. It is Overseas Containers Ltd, which chose the AS/9000 in preference to the IBM 3081 and Amdahl 5080. It will be installed at OCL's head office in London in the second quarter of this year.

Italian delegation

A HIGH-LEVEL delegation from the Italian government has visited the UK to familiarise itself with developments in office automation. The head of the cabinet office, the director-general of the PTT and banking officials visited Nexos, Racal, Muirhead, ASTC, and Thames Television.

Turn Quay System

Tilbury Container Services operate the world's largest refrigerated container facility at Tilbury Docks in Essex. Their minicomputer-based container control system is now an essential part of the daily routine. Visual displays provide interactive cargo planning, taking into account variables such as cargo characteristics and destination. Several hundred thousand units are handled annually.

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JOB OPPORTUNITIES: Pages 23-45

COMPUTERVIEW

REMEMBER a time before you knew about computers? You probably knew about Tupperware, Delaware, nowhere and underwear, but you didn't know about hardware and software. For many, these two words, which conveniently separate the kickable from the unkickable, still have the ring of jargon.

Computer people are undeniably in a jargon-ridden business and are sometimes forced to defend the language they use. That defence is made more difficult as some of the jargon is sensible - and some is nonsense. We should be mindful of the distinction.

Every trade and every profession has its own share of jargon, which is more or less incomprehensible to other laymen. Dentists, journalists, road crews for pop groups, computer personnel, sailors, tinkers, tailors, soldiers and spies all speak in special tongues. Otherwise-normal people go to work and then talk of hooking up a pink noise generator, or going to the galley because the proof is missing, or singling up to a breast and spring both ends, or finding an occlusal on an upper left six.

Hands up those who can say something intelligible about, for instance, a multiple head crash.

Some jargon is used so widely that it filters into everyday speech and is assimilated

Ring of jargon

in the language. The rest of it remains gobbledegook to all but the initiates. Jargon is used for two contradictory reasons. In some cases it tends to precision and in others it is a vague covering for sloppy thought.

The first reason - and unfortunately the wrong and most common reason - for using jargon is to give the appearance of significance when true significance is either being hidden, or is lacking to start with.

A fine and barbarous example of this significance-seeking came from the mouth of a Ferranti spokesman describing a computer aided design project recently. Asked what exactly was being designed, he replied: "An aerically delivered area denial system."

A bomb by any other name. In fact a particularly nasty bomb with a landmine attachment that does not explode until the area around the crater is thought to be safe.

An ongoing area denial situation, so to speak.

Such words are necessary if you want to

label something without calling up a clear mental picture of it.

Less barbarous but more widespread is the phrase "cost effective", which is endemic among people talking and hawking computers. Salespeople are told to say it instead of "cheap", providing an example of an attempt to make the insignificant pale into significance.

At a recent Infotech gathering, a bunch of managers agonised over the vile phrase eventually to decide that it meant "to service the user at the lowest possible cost under current environmental circumstances".

Other cost-effective type horrors are trade-off, state of the art, leading edge, implement, parameter, facilitate, flexible, timeframe....

The second reason why so much jargon is heard, the one which is defensible and especially pertinent to the computer industry, is that it often describes what cannot adequately be described in any other way: new

words for new things like micro, micro, hardware and software. Our trade/profession has a shorter dictionary's worth of it, simply because it is so new. In fact, until given a car to look after, most people ever mentioned updates and processors until a word processor came along, a word of necessity.

Chambers' Dictionary is impenetrable but bears out the distinction between pretentious and the descriptive.

"Jargon, chatter, rambling, slang, artificial or barbarous language, terminology of a profession."

It is almost by way of a computer's definition has jargon as the "large profession". Unfortunately we are completely sure if we are part of a profession in an uneasy limbo between a profession. That unconscious is long an occasional insistence on being professional.

The unconscious is also behind the mouthing of too much jargon to stand. There is, however, a festivity in talking codes and bolognisms a cabal, a profession even.

But profession can be interpreted piece of jargon, can't it? There it is about people in glass houses....

Govt and industry to collaborate on information technology

A COLLABORATIVE project to evaluate information technologies, funded jointly by government and industry, promises to be one of the first of a series of initiatives by a newly reconstituted Electronics Economic Development Committee (EDC).

The new committee met for the first time last week, as a result of the National Economic Development Council decision, eight months earlier, to set up a group to oversee the rapidly converging and developing areas of telecommunications, computing and microelectronics.

There would be no large financial handouts, though considerable help could be given through a public purchasing policy.

hampered by the absence of a positive industrial policy.

The benefits of the demonstration project are envisaged as its ability to:

- Assess market reaction and test marketing assumptions, such as price and elasticity of services;
- Prove technical feasibility;
- Stimulate development and production of systems and equipment for export markets;
- Provide information to assist public policy decision, eg UK satellite policy;
- Provide a shop window for export sales; and
- Stimulate "information providers" to supply data and services for such systems.

The most likely area for the demonstration site is one containing a high proportion of commercial users to domestic users; a high proportion of well-educated, better-off domestic users; and a dominance of high technology industry.

In addition to the demonstration project, the reconstituted EDC will work on a number of other fronts. It will review the structure of existing public arrangements on R&D to ensure they are coherent; it will work to identify mechanisms to encourage both the growth and formation of small firms; and will set up an Employment Task Force to solve manpower shortage problems.

The chief components of the project to be evaluated would be a large fibre-optic cable network, linking data based consumer electronic products, communication office equipment, and distributed data processing. Satellite communications (voice and data) would also be examined.

Hurdles

One of the first hurdles of this project seems to have been cleared in that the Electronics EDC has won the support of the major companies and trades unions, both of which agree that the performance of the UK industry has been

After the meeting Sir Henry explained that the UK electronics market had doubled in the last 10 years (adjusted for inflation) with UK manufacturing output doubling in the same period. Unfortunately import penetration had also risen, from 20% to 60%, with greatest inroads being made into the computer field.

Greatest scope for government help existed in the guidance it could provide to help the industry understand the importance of co-ordinated action to evolve its own structure, emphasised Sir Henry.

Initial plans had centred on the use of a 'green fields' site, where there was negligible existing investment in a telecommunications infrastructure. However, it was felt now that a mature, self-contained and balanced community would provide far better marketing information.

Most jobs require 2 1/2 years experience and when I ask the same answer, "a good question."

There is a local college, two-year course leading to national diploma in engineering and electronics.

Do firms offer training programmes?

Ashton, Northampton.

ALAN WILLIAMS (Trader)

SMR Ltd, 99 Regent Street, London W1R 7HS

L. J. WELLS

Marketing Services Manager, Ansafone, Camberley, Surrey.

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ERIC A. HAWORTH, Management Control Systems

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Balanced

One of the UK's chief problems was that no companies existed with capabilities across the whole spectrum of information technology, as was the case with such organisations as IBM and Philips, said Sir Henry. It was because of this that the committee had started to formulate plans for a joint public/private sector demonstration and evaluation scheme for advanced communications technologies.

British Telecom would obviously play a leading role in this project.

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CHILVER... Import penetration has risen from 20 per cent to 60 per cent in 10 years

Amdahl to develop solid state file

AMDAHL is going ahead with the development of a semiconductor paging and swapping file similar to the 4305 sold by Storage Technology as an alternative to the IBM 2305 fixed head disc system.

One aim of the high speed file project is to take advantage of the six-megabyte per second data transfer rate provided by the block multiplexer channels on the Amdahl 580. This is the machine launched by Amdahl as a counter to the IBM 3081 (CV, November 27, 1980).

Amdahl sees an I/O bottleneck being created when the 580's channels are linked to the IBM 3880 disc drive controller. Its data transfer rate is limited to three megabytes per second, the same as the 3081 channel speed.

The 4305 from Storage Technology is implemented in 16K MOS RAM chips and is expandable in 11 1/4-megabyte modules up to a maximum of 45 megabytes.

At £200,000 for the biggest unit, the cost per bit of the 4305 compares favourably with fixed head disc storage and is a lot lower than the cost of main memory. According to Storage Technology the 4305 can be sold at this price because main memory charges are kept artificially high by IBM.

The data transfer rate of the 4305 is limited to three megabytes per second at the moment because of the 3880 channel speed, although Storage plans to bring out faster models for hosts like the Amdahl 580.

Intel also now offers a solid state replacement for the IBM 2305 called the 3805. None has been sold yet in the UK.

Two 128K ROMs from NEC

TWO mask programmable 128K ROMs are expected from Nippon Electric in April. Production is planned in the second half of the year at a rate of 300,000 devices a month.

The first, an NMOS device, is specified with line widths of three

microns, an access time of 250 nanoseconds and power consumption of 275 milliwatts maximum.

The other has been specified in CMOS with a four microsecond access time and a 30 milliwatt active power consumption. It will be housed in a 52-pin flat pack.

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Our picture shows a typical Bulletin viewdata application. A car salesman is using the Bulletin terminal to feed his sales returns direct to a computer system.

ICL viewdata for ME29 users

ICL's viewdata system, Bulletin, is to be available to users of the ICL ME29 in the UK and Holland from next week.

Designed for use in private viewdata systems, Bulletin was developed by ICL following trials with the Thornel system used in-house by Thorn Television Rentals on its ICL 1900. It implements the viewdata capability promised for the ME29 at its launch last March, since when over 700 have been sold. It will be available in other countries and for other machines in the ICL range later this year.

Bulletin's strength is said to be its ability to integrate viewdata with existing word processing and data processing operations.

The system rents for £8,500 a year and terminals can be ordered through ICL from Thorn for between £280 and £370 a year.

Models include a 26-inch television with a remote keypad and a 14-inch business terminal with either a numeric keypad or alphanumeric keyboard built in.

Our picture shows a typical Bulletin viewdata application. A car salesman is using the Bulletin terminal to feed his sales returns direct to a computer system.

BR returns to Redifon

BRITISH Railways Board has ordered a further seven mixed media computer systems from Redifon after the success of its pilot scheme, started two years ago. Included in the order, worth over £3 million, is a dual R400 data entry system, also from Redifon.

The previous £750,000 order was used for the pilot scheme based at British Rail Birmingham.

The optical character recognition key-to-disc system, conceptualised on applications such as payroll, freight accounting and accounts payable.

The next phase of the plan runs from March to December and will include installation of the systems at four sites. All applications currently being done on paper tape will be moved to the system.

Some don't

TDC is a member of the Financial Industry Group

Communications boost for IBM small systems

BINARY synchronous communications for the System 38, improved Systems Network Architecture support for applications programs on Series 1, and 3270 emulation on the 5280 distributed data system are included in the clutch of new products announced last week by IBM's General Systems Division (GSD, January 22).

The BSC support on System 38 will be available by April, 1982. It will enable the machine to communicate over telephone lines with 370, 4300 and 30XX mainframes, with Systems 3, 32, 34 and other System 38s and with the Series 1 and the 5110/5120 desk top machines. It can also link up with a variety of terminals, including the 5280, 5230, 5260 and 3741, but

not 3270 systems.

In a "statement of direction" to its customers, outlining plans for further communications capabilities for the System 38 over the next three years, IBM promised that it would add BSC, Multi-Link Remote Job Entry, BSC Multipoint Tributary Connection, and Systems Network Architecture Remote Job Entry (SRJE), in each case to a 370, 4300 or 30XX host.

The start of SNA support for the System 38 has now been moved forward to April this year. Other new facilities for System 38 include several programmer productivity aids, incorporating a feature called Screen Design Aid (SDA), for generating application menu programs.

The improved SNA support for

Series 1 enables applications programs under either the RPS or EDX operating systems to communicate with a CICS or IMS application on the remote host. Another new communications product is the Communications Monitor, a licensed program product that manages communications between two Series 1s, between a Series 1 and other computers, and between Series 1 and various I/O devices.

IBM has also jumped on the local "ring" bandwagon, albeit in a limited way, with the Local Communications Controller. It takes the form of a single PC card added to each Series 1 and enables up to 16 of them to be interconnected in a "ring", with full duplex transmission at up to two megabits per

second. The "ring" itself consists physically of a twin-axial cable — two co-axial cables in parallel.

IBM explains that each Series 1 can direct messages to any other Series 1 unit in the "ring" without the need for a master controlling station.

Each Series 1 can selectively broadcast to any or all of the other Series 1 units, by means of user-written code.

The 5280 distribution data system can now appear to a remote host as a 3270 controller in either a BSC or SNA environment. Operations supported include batch communications using 3270 line protocols over a BSC network, as well as interactive working under either BSC or SNSDL.

Thomson-CSF begins production of household computers

THOMSON-CSF is to begin manufacture of personal computers at retail prices ranging from £240 to £330 at its factory in Moulins, central France, at the end of 1981.

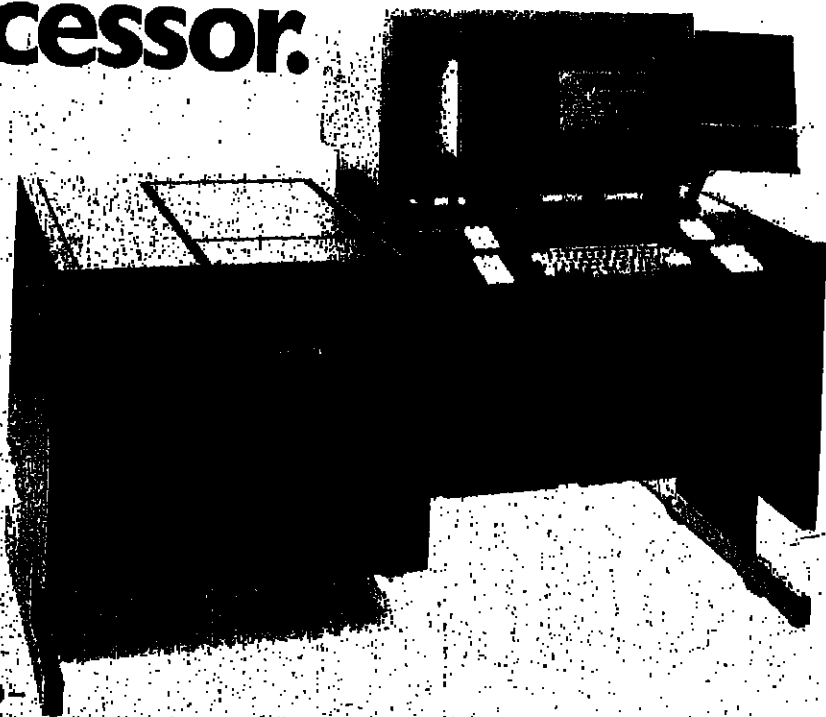
The French manufacturer says it is confident it can snatch sales from Sharp, Matsushita, Commodore and Apple thanks to its nationwide distribution network. Thomson-CSF's chairman,

Michael Wahlain, who announced the firm's entry to the household computer market, said: "Electronics for the consumer in France is going to have a name: Thomson."

Wahlain said the Thomson

models would control and program household equipment, question viewdata-type data banks, plan home budgets and be geared to function with France's future electronic telephone directories.

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Digi-Data sees lightness and compactness as two of the main attractions of its Model 1516 printer terminal, shown here. It weighs 42 lbs and measures 21.9 x 18.5 x 8.5 inches.

Digi-Data launches its first printer terminal

WELL-ESTABLISHED as a supplier of magnetic peripherals, Digi-Data has moved into the printer terminal manufacturing business with the launch of the 2510 series of high speed matrix printers like the Texas Instruments 820 and the Tally T1612.

Digi-Data is seeking UK distributors for the 1510 terminals because end user sales are expected to account for a much higher proportion of shipments than with the company's tape drive and controller products. The first to be signed up is Dicoil Electronics of Basingstoke, best known as a supplier of systems based on the Digital Equipment LSI-11. Two more distributors are being sought.

An interesting aspect of the 1510

series is the use of simple keyboard initiated mnemonic commands for formatting features like margins and tabs, horizontal and vertical pitches and underlining.

Performance features include 150 and 200 cps printing speed achieving throughputs between 50 and 250 lpm and a maximum baud rate of 19.2K-baud. An optional extended buffer can hold a full 8K character by 25-line screen.

The 1510 family comprises two models at the moment, the 1510 KSR version which costs £1,200 and the Receive Only 2511 model at £1,070.

Manufacture of the 1510 terminals is carried out in the US by Digi-Data itself, apart from a nine wire ballistic print head which is bought in from La Siegle.

Yorkshire Bank orders De la Rue cash dispensers

TO speed up customer service, the Yorkshire Bank Group has placed an initial order with De la Rue for 10 of its new 1320 teller assist cash dispensers. The 1320 operates in stand-alone mode and enables a cashier to dispense any mix of up to four note denominations. It also prints a record of all transactions. The microprocessor-based 1320 can be tailored to suit the requirements of individual banks including data recording, cashier identification, customer account number recording and batch and

grand totalling of dispensers. A keyboard terminal on the counter displays messages to guide the cashier through each stage of operation.

De la Rue is well established in the cash dispenser business. It supplies mechanisms on an OEM basis to manufacturers of through-the-wall units like NCR and IBM.

Teller assist systems like the 1320 are designed to speed up the cashing of cheques by cashiers.

Measuring up to DP

THE French Thomson group's TITM company has added to its activities the production and marketing of measurement data processing systems.

TITM is challenging the dominant role on the European market of the US firm, Teledata. Its target is a 100 million franc (about £24.5m) turnover by 1985. Be-

tween 25% and 30% would be derived from exports.

It sees a big market ahead for its DPMS 1000 centralised measurement system which links measuring equipment by telephone lines.

The DPMS 1000 makes possible worldwide weather forecasting by correlating a wide range of measurements from scattered sites.

GREATER MANCHESTER POLICE

The Greater Manchester Police, a major law enforcement body in the north of England, has purchased a large number of personal computers from the Compugraphic Division of Gestetner Limited. The purchase is part of a major programme to modernise the force's data processing systems.

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MICRO NEWS

UK can learn from rivals in govt aid to electronics, says EDC

GOVERNMENT support and guidance of the UK electronics industry compares unfavourably with that given by its chief competitors — Japan, the US, France and West Germany.

At its first meeting, the restructured Economic Development Committee (EDC) for electronics agreed that there is considerable scope for changing present policy within UK industry and government. These main changes of policy are likely to be implemented in the form of co-ordinated national R&D and marketing strategies.

Japan, West Germany, France and the US all experience faster growth in the electronics industry than the UK, and, as the EDC points out, there are several striking similarities between their policies.

The key word singled out by the EDC appears to be "co-ordination". In each of the competitors' policies a single institution develops policies, assesses priorities and implements them over long periods, working closely with the industry.

Research and development is promoted by this institution, but sensibly shared out. For example, only a limited number of firms

specialise in microelectronic research. On the equipment user side, awareness is promoted. The EDC points out that the more co-ordinated this promotion is, the more effect it has.

European policies differ because up to now they have been designed to encourage existing firms within existing constraints. In particular, Japanese policies have always aimed to promote common technological targets through co-operative research.

By sharing application and use of basic technologies, the Japanese have managed to avoid intense internal competition and concentrate on competing with the US in an effort to close the technological gap.

No conflict

The Japanese have been successful in the electronics and many other industries because no conflict exists between the aims of national policy and the aims of industry. The EDC points out that Japan has a market economy rather than a "planned" economy; hence the government merely guides and assists.

The Japanese Ministry of International Trade and Industry also guides the electronics industry without funding. Its total funding

Japanese build trial GaAs computer unit

GALLIUM arsenide (GaAs) large scale integration devices have been developed by scientists of the Japanese Ministry of International Trade and Industry, using a new method which has facilitated the implementation of such devices within a trial computer unit.

The research team of the Electrotechnical Laboratory, Agency of Industrial Science and Technology, has built the trial computer unit using line geometry of three microns. It comprises 11 elements and can achieve speeds of 120 picoseconds per element with a power consumption of 10-12 milliwatts.

Unlike silicon devices, gallium arsenide elements are suited to superfast computers, because of their high operating speed and low power consumption. Up to now, application in computer systems has been limited because of manu-

facturing and development problems.

The new method developed by the research team involved the application of a special Schottky-effect junction to replace existing bulky, power-consuming Level-Shift circuitry. The gallium arsenide semiconductor used was the Normally-On type which required connections between each pair of elements to control their voltage difference.

The team considers that if the trial computer unit is taken down to one micron dimensions or less it will be possible to get down to speeds of 50 picoseconds, maybe 20 or 30, and a reduced power consumption of a few milliwatts.

An official programme to develop such a computer is planned this spring by the Ministry of International Trade and Industry.

Voice control in VLSI design

A VOICE recognition module called Harmony has been designed for use with a very large scale integrated (VLSI) circuit designing system.

US company Calma, based in the silicon valley, developed Harmony to give the user voice control of a computer system.

The voice recognition module attaches to the company's vector memory display terminal, which in turn connects to and controls the operation of Calma's Graphic Display System II, a computer aided design manufacturing system.

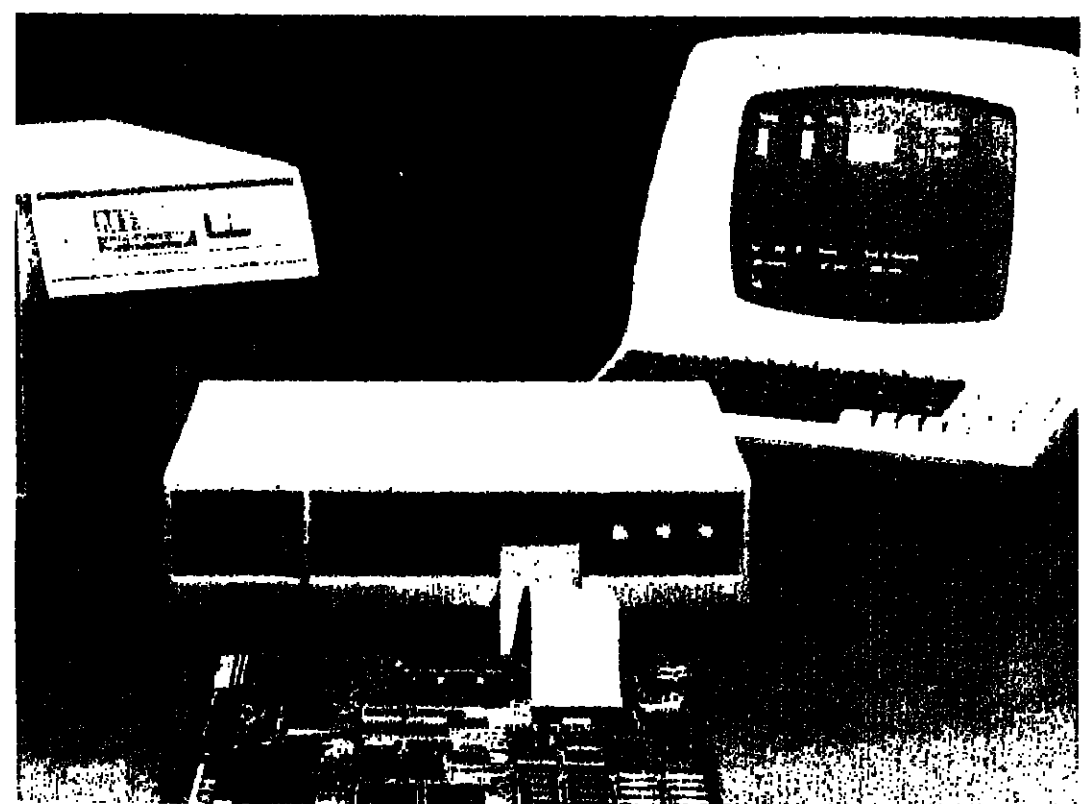
Toy boom on the decline

DEMAND overlook supply at Christmas in the electronic toy and game business, but the boom is not likely to last, according to industry insiders.

From 1977 to 1978, US sales of electronic toys and games increased five times over, while from 1978 to 1979 they tripled. In the period 1979 to 1980, sales were expected to double but they have dropped by only 10 to 20% to

about \$450 million. Reasons given for the decline include the recession, the novelty having worn off, and the variety of toys on the market making it difficult for consumers to choose.

US manufacturers are already feeling the effects of the plummeting market. Mattel has reported reduced profits, and Milton Bradley has had to close a year-old factory in the Caribbean.



Zilog's ZSCAN 8000 development system operates with a host computer to provide emulation for the company's 16-bit microprocessor the Z8000. It can also act as a stand-alone system.

We fix errors on the run.

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NS11E offers a memory capacity of 128 Kbytes (64x256). The newly developed correction procedure checks every single byte but won't lose speed in the process. Moreover, it works with only a single 5 volt supply current. (The NS11E fits into the PDP-11/04, 34, 40, 44)

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Hoskyns beats the recession

HOSKYN'S GROUP, the company founded by John Hoskyns, now the Prime Minister's adviser on strategy, reports turnover for the year ended October, 1980 up nearly 50%, from £12,096,697 to £17,686,624. Profit is up from £643,000 pre-tax in 1978-79 to £1,151,000.

Hoskyns, now part of Martin Marietta Data Systems, claims that much of the improvement is a pay-

off from R&D investment in previous years, but an analysis of the company's pre-tax profits against turnover shows that the profit margin has moved from 5.32% last year, to 7.09% this year, still almost a percentage point below the industry median for last year (7.49%).

Jim Feeney, managing director of Hoskyns, attributes much of the

improvement in profit to the strength of sterling.

Unlike many other companies reporting recently, Feeney makes no formal complaint about higher interest rates which have cost the company £103,000 this year, against £20,000 last year.

According to the company, the worst of the recession appears to be over and Hoskyns is going into 1981 with one of the strongest order books yet.



FEENEY

CGS spreads its wings with big US consultancy

FRENCH software giant Cap Gemini Societ  has acquired a firm footing in the US with the purchase of Milwaukee-based D&S Corp. The move follows last week's expansion into the Norwegian market with the acquisition of Data Logic (CW, Jan 22).

At the same time CGS has brokered off the long-standing licensing agreement with the US software products firm ADR so that it can concentrate on its own product lines.

Since the licence still had two years to run, ADR has acquired Cap Gemini Societ , part of the CGS group, as its outlet in France, to be called Applied Data Research, France.

CGS results this year mean that the company can afford to grow, especially on foreign ground. "What D&S can give us is a wide network of branches in the US," explained CGS chairman Philippe Dreyfus. "Also its business is essentially in the private sector - industry, banking and commerce - whereas our work in the US up to now has been in the public sector."

CGS already has an office in Washington of some 30 consultants concentrating on federal and administrative projects. "It takes a long time to grow abroad when you are based on home ground," said Dreyfus. "As it is we now have a ready-made force of 500. We could have waited 10 years to grow from 30-strong to that size."

A new branch of Cap Gemini Societ  is opening in Boston to sell products.

D&S, one of the most prestigious consultancy operations in the US was ranked second after IBM in a recent brand preference study conducted by Datamation.

The D&S Corp employs about 500 people across the US, with the majority of its offices concentrated in the Eastern seaboard and in the Midwest.

With total revenues last year of \$22.5 million and profits of



DREYFUS... "D&S can give us a wide network of branches in US."

\$900,000 the acquisition of D&S will provide a substantial addition to revenue and profit for the CGS group.

With D&S, CAP Gemini acquires a range of software packages including program conversion software, one of D&S's software specialisations.

No price was quoted for the D&S acquisition, but about \$10 million would be in line with the price Scicon paid for System Control recently.

The move away from ADR is linked with CGS wider ambitions. "For 10 years we have been acting as a sales outlet for US products," said Dreyfus, "and it means that we put a great deal of selling product, that contributes little to our income, and nothing to our own technical development."

CGS will be exporting its own software and what it calls "hard-copy" products such as its new grammar, SIP. Products include a file interrogation software SYSPRO for IBM-based mainframes, its automatic text composer A-DOC, and a high level language, developed along the same lines as CAP's MicroCobol but based on a subset of PL/I.

ICL, Fujitsu fight it out Down Under

THE Australian computer market, once the exclusive preserve of ICL, is now the scene of a major confrontation between that company and Japanese giant Fujitsu.

Fujitsu has beaten ICL to the post for a series of Australian public authority open tender contracts.

The battle for the mainframe business is expected to move to Europe this year and the trading results for the two companies in Australia last year clearly show how the battle has gone.

First, the ICL results: For the year ended September 1980 International Computers (Australia) Pty reported a profit of \$137,129, against a loss of \$160,894 the previous year. Turnover was up 48% to \$567.5 million from just under \$350 million in 1979.

Stan Owens, head of ICL's

operation in Australia, said the return to profit was achieved despite a loss on foreign exchange of \$1.74 million. This compares with a loss in 1979 of over \$4 million on currency transactions.

Owens observed that the strength of sterling had added appreciably to product costs. However, the company ended the year with a record order book, including the first 2966 sale.

In the consolidated report for the ICL group the Australian figures are hidden in the turnover for the Australasia and Asia region. On this basis the Australian operation contributed just under 50% of the turnover for an area which takes in New Zealand, Hong Kong, Malaysia, India, Singapore and agencies and dealers in most of the other countries of the region.

Australian subsidiary's turnover up 550%

FASCOM (Australia) Pty, the Fujitsu marketing subsidiary in Australia reported a 550% increase in turnover, from \$38,000,000 in 1978/79 to \$43,000,000 for 1979/80. The company has moved into profit for the first time since setting up in Australia in 1972, with a modest \$10,000 profit for 1979/80, against a loss of \$4,000,000 in 1978/79 and accumulated losses of \$13,000,000 since starting up.

The spectacular turnaround was achieved primarily through the successful selling of 21 of its medium-sized F model systems, the equivalent of the IBM 4300 and the ICL 2900 series.

The company appears to have achieved a major breakthrough at the upper end of the market where it sold an Amdahl V7B to Esso

Australia. Fascom also captured the plum of the Australian computer market last year when it sold to the Bureau of Statistics two M200 machines worth a total of \$9.5 million.

According to the company it sold its machines in 11 out of 17 open bids where the user changed supplier.

According to Mike Roydon, Fascom managing director, the company increased its staff over the year from 150 to 260, giving gross sales per employee of \$165,000. This is substantially better than many companies operating in the UK achieve. The median figure for computer companies in the UK last year was £20,000, about \$40,000. ICL had a turnover of £21,600 per employee in 1980.

COMPANY COMMENT

THE results of ICL Australia and of Fujitsu's marketing subsidiary there, make sombre reading.

Fascom has increased its market share substantially, primarily at the expense of ICL, though obviously not without inflicting losses on IBM.

Fujitsu may be using Australia as a significant market in which to test and run its large and medium-sized mainframes.

Although Fujitsu likes to stress the facilities available on its machines, the real battle is based on price. For any given machine it is estimated that Fujitsu will provide a system of similar power for about one-third of the IBM or ICL price.

The price paid by the Bureau of Statistics for its two M200s at \$4 million looks about £2 million less than the fully set up cost of two ICL 2980s.

Logabax hires 20 more dealers

WITH its French parent company just saved from bankruptcy (CW, December 11, 1980) Logabax in the UK has announced that it is doubling its external sales network by hiring an additional 20 dealers. They will handle the firm's small business system range.

To reinforce its dealer network, Logabax is also setting up four dealer support teams to cover the whole of the UK and the Irish Republic.

The existing 15 dealers selling the Logabax LX2000 small business system and LX500 personal computer accounted for almost 35% of Logabax's turnover for the products during 1980.

The rescue operation for Logabax in France has involved major injections of cash, including about £12 million from Bletrobel of Belgium, which has increased its controlling share in the firm to 90%.

Two other sources which have already contributed about £2½ million, and are each expected to add a similar amount in the spring, are the French nationalised banks and the government investment body, CIASI.

Another £2½ million is being put in by the group set up early in 1980 to take over Logabax. The three members are banking giant Soci t  G n rale, aviation conglomerate Marcel Dassault, and Dassault's computer and electronics side, Intertechnique, which leads the group.

After going off the idea of a Logabax acquisition late last year and so plunging the company into crisis, Intertechnique finally agreed,

as a prerequisite for the plan, to pay £11 million in 1981, a 65% holding in the small and peripheral, manufacturing Logabax should perform better this year than in 1980.

Bletrobel is keen to improve its majority interest in Logabax. But so far, the redemption of the Logabax manufacturing operation in France seen as necessary to improve the company's image have not materialised. With a presidential election only a few months away the French government would be reluctant to prove any cuts in the wage workforce.

According to Logabax, FF85 million cash injection in the existing interest period scheduled for April, brought total contributed to the high rescue bid to about £30 million.

Prices will stay 'soft'

INTEL, the world's leading microprocessor chip producer, announced turnover for the year ended December 31 up 28% to \$661 million in 1979, to \$861 million in 1980. Profit rose 24% to \$77 million to \$96 million.

In the fourth quarter there was a slight drop in profit compared with the earlier part of the year.

Gordon E. Moore, the chairman, said there was a price decline in the second half of the year, and he expects prices to stay "soft" until the summer.

Profits doubled

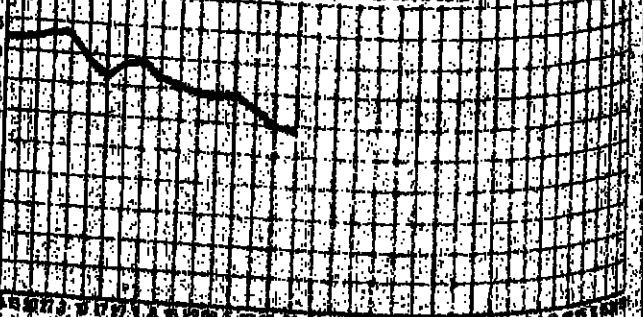
MINIDISC maker System Laboratories Inc, which recently went public in the US has revealed quarterly revenues for 1980 were at \$9.9 million. Profit was doubled, from \$249,000 to \$482,000.

CW SHARES TABLE

Date: 2/21/81	Price	London Stock Exchange	Price	US Stock	Price	US Stock
High	Low	High	Low	High	Low	High
110	105	110	105	110	105	110
105	100	105	100	105	100	105
100	95	100	95	100	95	100
95	90	95	90	95	90	95
90	85	90	85	90	85	90
85	80	85	80	85	80	85
80	75	80	75	80	75	80
75	70	75	70	75	70	75
70	65	70	65	70	65	70
65	60	65	60	65	60	65
60	55	60	55	60	55	60
55	50	55	50	55	50	55
50	45	50	45	50	45	50
45	40	45	40	45	40	45
40	35	40	35	40	35	40
35	30	35	30	35	30	35
30	25	30	25	30	25	30
25	20	25	20	25	20	25
20	15	20	15	20	15	20
15	10	15	10	15	10	15
10	5	10	5	10	5	10
5	0	5	0	5	0	5

The table shows the closing prices in London on Friday and in America on Thursday. The shares are based on the prices of the UK companies in the table. The US shares have been adjusted for currency conversion.

*Shares dealt in, in the United Kingdom Market or under Rule 144 USA.



PROGRAMMERS' PAGE

Computers find a role in films, music and art

COMPUTER printout as an art form is not something that crops up all the time in your average general ledger system, but Art is a wide field and has ranged from mobiles made from paperclips to bicycle tracks across virgin paper. So harnessing the ubiquitous computer to the Cause is, dare I say it, logical enough.

In the early computer days there were many claims of how machines could be programmed to compose symphonies, write best-sellers, and even, given the impertinent data, to out-Picasso the Cubists.

Results were disappointing, though. The sheer ponderousness of the task, to program even an outline figure, was not realised, and styles were woden and predictable - which was perhaps inevitable.

The situation today, just as full of possibilities, is more realistic, with the computer used as the tool of a creative human. Given the decreasing costs of hardware and increasingly easy-to-use software, computer art is booming among film-makers, composers, and artists.

Arts Society

The Computer Arts Society was formed in 1968 as a specialist group within the British Computer Society. It aims to encourage the creative use of computers and has a worldwide membership of 600, with 300 in the UK and the remainder divided about equally between the US and the world. Besides the London branch in Russell Square there are two others, in Paris, and in Michigan.

Secretary of CAS, John Lansdown explained to me that the major artistic contribution of the computer is to graphics and electronic music. Computer generated graphics are used extensively in animation, for films and commercials - indeed, it has now become so expensive to produce hand-drawn cartoons that 20% of all animation in the US is carried out via the computer.

"Given enough money," he said, "any image can be synthesised."

One artist at present in the US is Tony Longson on a Bicentennial Arts Fellowship in California. He has used computers in his work since 1973 and specialises in three-dimensional shapes made of images printed on layers of clear perspex. As the viewer moves, the shapes change and evolve into different forms - Longson describes them as "drawings in space."

Planets

He is also fascinated by pictures of planets and his fellowship fortunately takes him to the Jet Propulsion Laboratory in Pasadena. Here computers fabricate pictures, composed of an array of tiny units, from signals sent back by space vehicles. Each unit can be defined by colour, size, etc, and controlled, in the final image, Longson has had several exhibitions, including two in the US in 1979, and one last year in Oxford.

Working in Britain, on a Science Research grant at Leicester Polytechnic, are Brian Edmonds and Stephen Scrivener.

They have been experimenting with raster images which not only

offer such advantages as colours, solids and grey scales, but also describe the image as a matrix of points, each with a particular value, that can be stored in a special section of memory. Writing to the memory reproduces the image, while reading allows inspection.

The plus factor of the matrix system is that the image maps directly on to its representation: the computer in effect "looks at" the image on the screen.

In the more conventional vector system the image is held as a list of vector points, so is only a representation of an abstract structure. The user, at one step removed, does not have direct access to the image but must learn to manipulate the abstract to affect the representation.

Two of the graphics are illustrated, showing a man with and without his hat. The hat can be removed with an ERASE command, stored actually on the edge of the screen, and recovered with a COPY. A cursor used in conjunction with FILL would block in any desired part of him, and can be stopped when his flesh becomes that bit too solid.

Edmonds and Scrivener are now turning their attention to matching human and machine perceptions. They aim to write procedures that will translate the perspective inherent in two-dimensional pictures, into new images, taking into account the figure/ground relationships of the original.

Acceptable

Another "artist" concerned with perception and perspective is Dr Chris French of UMIST, Manchester. He made a fairly light-hearted investigation into "whether computer art is a load of quasi-spherical objects."

He was set rolling by an Alan Parkin article on computer plotting of illuminated balls, given details of size, position and direction of illumination. Chris French bounced up one better by rewriting the routine in Fortran-IV, and modifying the light to a point instead of a parallel source - it gives a more artistic effect.

Some of his effects are illustrated. The centre-piece shows a helix of balls turned around to expose the central tunnel. Bottom right, another double helix of balls is printed to overlap each other's positions in space.

Chris French believes that computers will take over from the spray-can and graffiti-covered wall, as the time honoured tool for expressing creativity. They will soon be within the reach of everyone's pocket, he says, and are slightly more socially acceptable as a medium.

Harmonics

In music the computer plays its part in two ways. It can be used to aid composition by controlling synthesis and harmonics, or as a device to produce sounds directly. Control is practised mostly in UK and Europe, while production is more common in the US.

The internationally known composer Kanakis produces sounds of synophony sound by using the computer to calculate the probabilities of harmonics. Benno Arman, the notable Swiss conductor and composer, turned to electronic music in his Sixties after a distinguished lifetime in music, and has collaborated with universities in Europe and America.

Top right of the montage is an excerpt from his "Splendeurs Nocturnes" (produced in 1973/76 using a PDP-15. Arman, by re-coding a PDP-15, generated 12 phases constituting the 12 steps of a "Principal Curve". Each phrase

is linked by a glissando and staircase curve, produced and controlled by the PDP-15. The piece culminates in five levels of sound descending from the high pitched continuous tone of the Principal Curve, to the calmer lower notes of the glissando and staircase.

One of the most significant contributions to computer music has been made by the British-based Electronic Music Studios. Besides carrying off the first prize in 1975 for the world's best computer music program, with "Musys," they have a whole list of achievements dating back to 1967.

Musys is a series of programs designed to process sounds, dealing with scientific as well as musical aspects. It was written mainly in Fortran by Alan Sutcliffe, though Peter Grogono wrote the compiler.

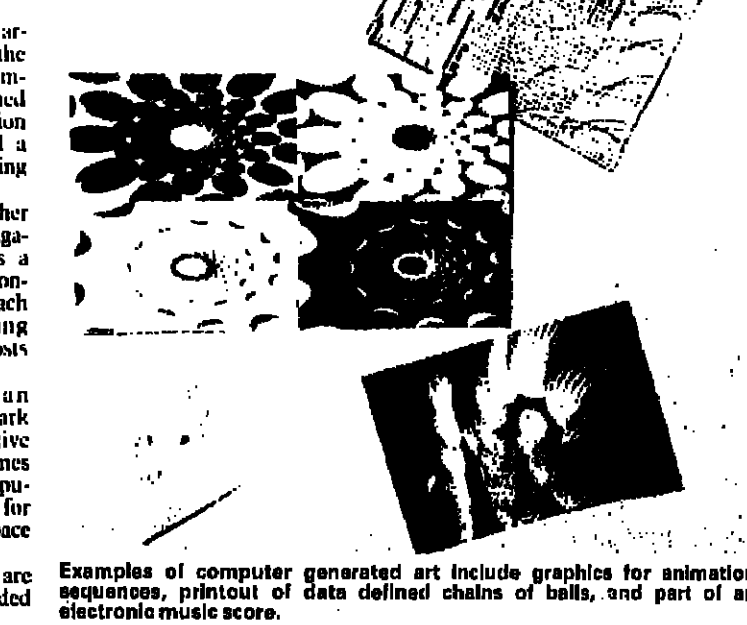
A forthcoming week of seminars and concerts on the theme of "The

Composer and the Computer" arranged for February 17-21, has the sponsor IRCAM calling for computer compositions. It is planned to mix discussions on composition with two sets of concerts and a presentation of tape-works giving an overview of computer music.

To spread the word and further its aims, CAS produces a magazine, Page, issued four times a year, and holds meetings in London on the first Monday of each month. Membership, running from January to December, costs £4 and includes copies of Page.

Each year CAS elects an honorary life member, to mark outstanding services to creative computing. Last year it was James Blinn, who produced the computer simulations and animations for Voyager and the Jupiter Space project.

Computer art and music are setting in well. All that's needed now is the best-seller.



Examples of computer generated art include graphics for animation sequences, printout of data defined chains of balls, and part of an electronic music score.

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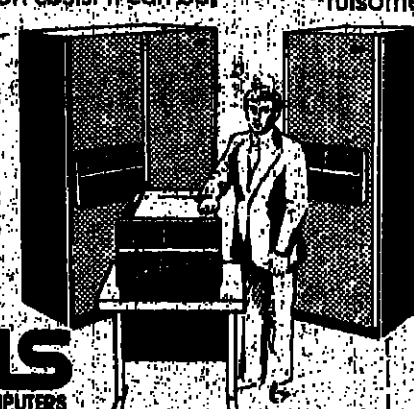
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Entries are now open for Computastars 1981 — and for the Computatug special

Sponsored by Computer Weekly and Wright Air Conditioning

COMPUTASTARS is back on the road... The time has come again for sportsmen and women from the computer industry to don their

tracksuits and test their skills and stamina in an effort to find the best all-round teams from the UK and Holland.

As with previous Computastars, individual talent will be given recognition and to provide flexibility within the competition at regional heats and finals, events may vary.

First UK heat will be for the Midlands region in Birmingham on April 25. The Southern heat will be held in Barnet on May 16 and the North gets its turn in Cleekeaton on June 6.

Finals will be in July at a date and venue yet to be announced. European finals, in which the top

three men's and women's teams will take part, will be in Holland in September.

Companies may enter one men's or one women's team or both, although additional teams may be entered in other regional heats. Acceptance of teams per region will be limited to 35 teams per heat, so it's first come, first served.

Closing date for entries is February 28 and the entry fee is £25 per team.

At the foot of the page there are two entry forms. The first is for Computastars, the second for this year's special tug-of-war event.

Computastars is sponsored by Computer Weekly and Wright Air Conditioning.

DON'T CALL US.....

COMPUTASTARS is a popular event and consequently attracts many enquiries. If you have a query, please don't contact us at Computer Weekly — get in touch with the staff at Computastars, 117b High Street, Croydon, Telephone 01-688 6690.

Only the strong need apply

By way of a change, an additional competition is being held this year, the Computatug. An opportunity to prove superstrength, this tug-of-war is open both to teams of five men and teams of five women, but not to those competing in Computastars teams. Cost is £5 per team.

Individuals may enter at a cost of £2. The entrant for the strongest individual can be a member of the team entry — but the event will be strenuous, so the organisers do not recommend it. Same rules and eligibility regulations as for the main competition apply.



Johan Brouwer, of Digital Equipment, demonstrates his skill in the football dribbling relay at last year's Computastars.

Ground rules of the competition

TEAMS will consist of not less than three and not more than five people.

Each team is required to nominate a No. 1 competitor who will, as well as being a member of the team, compete for the individual title.

The competition will be run in two sections — men and women. Teams will compete in regional preliminary heats.

The winning teams from each region will be invited to participate in the national finals. The top three men's and women's teams from the national finals will be invited to participate in European finals in Holland in September.

Each team must provide a marshal — not a team member — who may be required to assist in the smooth running of the competition. Failure to provide a marshal for each round in which a team competes will result in penalty points being deducted.

In each event in each round three members of the team will compete — the nominated No. 1 and any two of the remaining team members selected by the team captain. Team captains must be a member of the team, and with regard to team selection etc, the organisers will only recognise the team captain's selection.

Should the No. 1 be unable to compete after being nominated, then the team captain will nominate a substitute from the remaining team members. If the substitute for a No. 1 is used after the competition has started, then neither the original No. 1 nor the substitute is eligible for the individual title.

If a No. 1 is substituted he may

not take part in the remainder of the competition. This rule will also apply to the nominated substitute.

Failure to comply with the nomination of teams and the rules of substitution will result in immediate disqualification.

The competition will normally consist of eight events. These will be selected from the following types of events, which apply to both men and women.

1. Running events — any distance up to a maximum of 800 yards per individual and may include hurdles.

2. Throwing events — with a range from a cricket/tennis ball up to a competition weight shot. Basket or netball type skills may be included within this category.

3. Kicking events — any number of categories which demonstrate foot co-ordination and skill, target shooting, penalties, dribbling, rugby drop kick, hockey-style events.

4. Gymnastics — short, sharp and usually somewhat tiring.

In the running event teams may be required to run a relay. Running order will be at the discretion of the team captain.

In the case of a dispute the team captain and only the team captain will have the responsibility of representing his team.

The breaking, in the team competition, the points scored by the No. 1 will determine the team place.

In the individual competition, the best effort in the last event will determine the individual place.

At all meetings the meeting referee's decision will be final and not subject to appeal.

Eligibility for events

ONLY personnel who are fully coated to data processing activities are eligible for Computastars.

Only personnel who are employed by their present company prior to February 1, 1981 can represent that company.

Should a competitor leave the employment of the company they represent then they will no longer be eligible to represent that company after the date of leaving the company.

Companies may enter one men's or one women's team or both, in each heat. Additional entries of one men's/women's team may be made in other regional heats.

Teams may consist of members of a company drawn from different locations.

Contract staff may be used subject to the qualifying conditions.

Once a person has been nominated for a specific team, they may not represent any other team in the competition.

Once a team entry has been accepted there will be no refund of the entry fee.

All costs incurred by teams are the responsibility of the teams.

All competitors, participants at their own risk and the organisers do not accept any responsibility for any injury or loss of personal or company property.

All entries must be signed by the data processing manager or an equivalent authority.

How to trap the electronic spy

WITH the proliferation of data networks, concern is growing in the United States about electronic espionage in the form of wiretaps and unauthorised database access from remote terminals.

Computer-related fraud already accounts for losses estimated at \$2,000 million a year, a figure that is expected to rise dramatically as more systems go online.

As the stakes are rising, wiretapping is becoming easier and cheaper. Also, since the wiretaps can be operated remotely, today's cavedroppers are less likely to get caught.

Further, since information may be stolen without being removed, the theft can go unnoticed so the information leak can continue indefinitely.

What may be worse, the intruder who gains access to a database may not steal the information but simply change it. The firm then operates unknowingly with false data.

Key control

In the face of this increasing vulnerability, users have a new tool for protection against unwanted intrusion.

It takes the form of a data encryption standard which defines an algorithm, or set of procedures, for enciphering data before transmission and deciphering the received messages.

To guard against unauthorised access, data may also be stored in encrypted form. While the so-called Data Encryption Standard, DES applies only to US government agencies, it is also becoming a de facto private sector standard.

The DES algorithm is used for encryption in combination with a secret 56-bit key to encipher data in 64-bit blocks. The process involves a series of manipulations involving transposition and substitution of individual bits under key control, the process being inverted to decipher the message at the receiving end.

Algorithm and key are analogous to an electronic combination lock, where the algorithm is the mechanism that locks and unlocks it.

Even if the mechanism design is known, a combination lock cannot be opened unless one has the combination. Similarly, even though the DES algorithm is public knowledge, encrypted data is secure while the key remains secret.

Critical note

Users derive many benefits from the DES standard. It gives them a valuable yardstick to evaluate data encryption equipment and the standard permits mass-production economies for semiconductor firms which can thus implement the DES algorithm in reasonably priced LSI chips.

Even so, there are a number of opponents who claim that the DES is inadequate and will only be useful for the next five years, since by then advanced large-scale integration and computer science will make it possible to break a DES encrypted easily. Others question the circumstances surrounding the adoption of the standard, which involved some behind-the-scenes manoeuvring by IBM and the US National Security Agency.

DES history dates back to 1973 when the US National Bureau of Standards (NBS) requested the submission of data encryption algorithms for consideration as a Federal Information Processing Standard.

IBM responded by submitting an algorithm developed by Walter Tuchman and Carl Meyer of its Communications Systems Development Laboratory in Kingston, New York. NBS published the algorithm in March 1975, and it

became a Federal standard on July 15, 1977.

Before adopting the standard, NBS ran it by the National Security Agency (NSA), which is responsible for code making and breaking operations in the United States and the security agency persuaded IBM to reduce the key size from its original 128 bits to 56.

This gave rise to the charge that the NSA did not want a publicly available code that it could not break. Critics asserted that the NSA could overstep on commercial transactions if it so chose by reducing the DES key size.

Fuelling suspicious even further, the security agency also asked IBM to classify its working notes on the algorithm. IBM had inadvertently reinvented techniques similar to those used by the agency in developing its own algorithms.

The controversy became so intense that the Senate Select Committee on Intelligence held hearings, concluding that the NSA did not tamper with the algorithm design and that IBM had agreed that the 56-bit key size was more than adequate.

Even so, controversy persists about the DES. One opponent, Martin E. Hellman, of Stanford University, claims that DES encryption could be broken quickly by using many parallel chips to test all possible key combinations.

Professor Hellman points out that a single chip searching one key per microsecond would take about a million days to exhaust all 256 keys, but that a million chips could search them in one day.

Public key

Professor Hellman is also concerned about possible "trap doors" in the DES algorithm, which would allow IBM and NSA, for instance, to break the standard in minutes using a rival.

IBM's Tuchman dismisses the possibility of secret trap doors, saying that they would be detected easily by NBS.

He also notes that if the 56-bit key were considered inadequate for an application, one obvious solution would be to encrypt twice for a total key length of 112 bits.

Tuchman estimates that the power needed to exhaust a 112-bit key would employ all the energy in the United States for 600 years.

He looks more favourably on another suggestion by Hellman, namely using a "public key" system in which the encryption keys are known but decryption keys are kept secret.

A public key system could be particularly useful for electronic mail applications, for instance, or for authenticating digital signatures.

Professor Hellman views public key systems as a complement to, rather than a replacement of, conventional key systems. While such systems may sound totally insecure, proponents claim that they are unbreakable since the decryption key is derived by a mathematical relationship, i.e. complex for resolution by even the most powerful projected computer system.

He compares a public key crypto-system to a new kind of strongbox with two distinct combinations; the first used to lock the box and the second to unlock it.

Since the locking combination is public knowledge anyone can lock up information in it, but only the

person for whom the information is intended could unlock the box to retrieve the messages.

Similarly, public key crypto-systems could be used to protect against forging messages by authenticating a digital signature. The enciphering key would be kept secret in this case and the deciphering key made public, enabling anyone to validate the signature.

While IBM's Tuchman acknowledges that the public key algorithm has merits, he warns that it must be researched, tested and validated before it can be considered

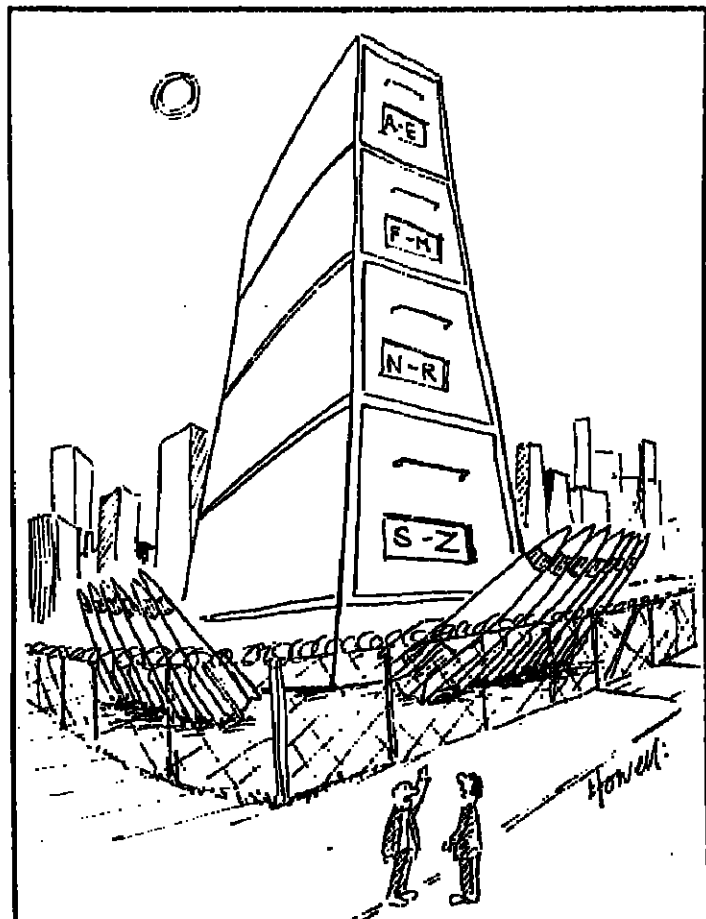
seriously for general use.

In the meantime, the DES algorithm is meeting the cryptographic acid test: it has been attacked for a number of years by experts in the field and they have not been able to show how to break it. Several manufacturers have implemented the DES algorithm in LSI chips and software implementations are also available.

In hardware a DES unit takes about six microseconds to encrypt or decrypt one 64-bit data block.

It takes about six microseconds to load a key or to load or unload either plain or enciphered text, typical software execution time running from 30 to 100 milliseconds.

While the mass-production economies of LSI circuitry may bring DES chips closer to the \$50 range, a stand-alone encryption device may cost \$3,000 or more because of additional circuitry and the programming needed to support a number of terminals and operating modes.



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How to become a competent programmer

Guide to Good Programming Practice, edited by Brian Meek and Patricia Heath. 128pp. £10.50 (hardback) and £3.95 (paperback). Published by Ellis Horwood Ltd, Market Cross House, Cooper Street, Chichester, PO19 1EB.

THIS collection of 19 essays is grouped in five chapters with contributions from 10 different authors, providing a readable account of an excellent range of topics.

Chapter 1 is entitled Strategy and Design and the introductory section states: "The object of this book is to present, in a compact and assimilable form, the essentials of what is involved in being a serious and competent programmer."

In a textbook any omissions, and these would be inevitable, might lead to criticism by a reader missing his or her particular fustian. Taking a few essays at random may give some impression of the topics covered. In the first group

there is a contribution entitled Design of Algorithms, which is one of the longest essays in the book.

It is both readable and, among other things, gives a very good account of recursion with reasons and justification for its use together with some simple examples.

This is a technique which is often difficult to explain to students who have not found the need for it and this account is very well presented.

Chapter 2 is on program writing and covers choosing the language, programming language standards and structured programming.

The programming language standards mainly refer to Fortran, but there are points which can be applied to many languages.

The essay on structured programming is practical and one of its best features is analysis of a subroutine presented first in its original unstructured form and then re-written with the improvements explained in detail.

The third chapter, Program Development, has three contributions: Structured Programming and Error Prevention which ought to be mandatory reading for every trainee programmer; Testing and Debugging, which is seldom covered in standard programming texts; and Improving Run-time

Performance which is mainly Fortran-oriented.

Chapter 4 bears the heading Special Problems and covers heuristic programming, large quantities of data, large programs, programs with long run times and real-time programs.

One example worthy of note is contained in the essay Large Quantities of Data which uses as an example the computation of mean and standard deviation from a set of data. This is one of the most programmed algorithms.

This text is to be recommended most strongly to any student or practising programmer. The more experienced may not agree with every statement or view expressed in the book but would acknowledge the thought provocation.

As a final quote from the Introduction explains: "Some of the advice may strike you as trite and obvious; if so, well and good. If some helps you to recognise, formulate and rationalise things you already know into a coherent 'philosophy of programming', even better."

"If anything strikes you as a new idea worth considering (or possibly as a brilliant flash of enlightenment), that is best of all."

D. W. BALE

IFIP report is weighty in every sense

Information Processing 80, Proceedings of IFIP Congress 80. Edited by Simon Lavington. 1070pp. \$102.90 North-Holland Publishing Co, PO Box 211, Amsterdam, Netherlands. Tel: 010/31/20/5153347.

AS consolation for those unable to attend the IFIP 80 congress held in Tokyo and Melbourne last October, the proceedings are now available in the form of a hardback book which is weighty in every sense of the word.

Edited by Simon Lavington of Manchester University Department of Computer Science, the book details all 160 or so invited and submitted papers, discussing the information or message presented often considerably more comprehensively than the actual spoken presentation.

The only major parts of IFIP 80 not covered are the 30 plus panel sessions held in Tokyo and Melbourne. Summaries of these were scheduled to appear after the congress in the Australian Computer Journal and the Journal of Information Processing published by the Information Processing Society of Japan.

IFIP 80 was the first World Computer Congress organised by the International Federation for Information Processing to be held outside North America and Europe and the first to be staged at two locations.

Tokyo provided the opportunity for English-speaking representatives from some of Japan's leading computer manufacturers

and research bodies to describe their work to a large Western delegation. The Japanese papers included fascinating accounts of novel computer architectures and dedicated database machines.

Database technology, with the social and economic implications of computers, were the two topics treated as areas of interest in their own right for the first time at IFIP 80.

Invited papers in the social and economic area included a depressing but thought-provoking discussion initiated by Calvin Gottlieb of Toronto University Department of Computer Science.

Gottlieb predicted that the use of computers would inevitably become more controversial with serious unemployment a certainty in the manufacturing sector.

He produced figures showing how several different organisations had increased productivity dramatically despite big reductions in their workforces and saw a day when computer professionals would refuse to participate in job-shedding projects.

The eight other subject areas covered by IFIP 80 were theoretical foundations of information processing, computer architecture and hardware, software, computer networks and communications, computing in science and industry, business and government applications, computers in everyday life and information processing and education. K.J.

Making case for 'project' approach

Project Management: A Systems Approach to Planning, Scheduling and Controlling. Harold Kerzner. 500pp. Published by van Nostrand Reinhold (1979).

THIS book sets out to sell the idea of project management - a management organisation structure around the production of a specific product. Kerzner argues that a project structure leads to greater management control, better estimating and budget management, and to an eventual better financial performance for the company.

Using plentiful examples of case studies, Kerzner shows how project organisation can be introduced in a company and how it should be organised.

Later chapters explain the planning process, show how GANTT and PERT/CPM techniques can be used in scheduling, review, describe pricing, and a plain schedule and cost control.

Kerzner writes confidently, in short sentences rich with American management jargon, but his style conceals a genuine understanding of his subject and his which are sound common sense.

The book shares the fact most management texts - making the process seem very straightforward and simple - but the practical chapters in particular are authoritative and useful.

MARTYN THOM

Fun approach to maths

Adventures with your pocket calculator, by Lemart Rade and Burr Kaufman. 139 pp. 95p. Penguin Books Ltd, 536 Kings Road, London, SW10 0UH. Tel: 01-551 2393.

ONE gripe I have always had against pocket calculators is that they weaken drastically the user's powers of mental arithmetic. Here is the antidote from Penguin Books.

Both mathematicians, the authors assume that the reader knows his/her way round the keyboard. If you don't, first read up on how to use a calculator.

The book is divided into two parts: a section in which the adventures are outlined and a section in which comments are made about them.

Most makes of calculator will be adequate for the exercises, though one or two of the tests require a

machine with a square root key unless you want to work out long-hand.

There are 20 chapters covering magic squares, playing numbers, least common multiples, squares, palindromes, the Fibonacci number, prime numbers, etc.

As a fun approach to maths using pocket calculators, it may not make your brain hurt.

CHRIS YOUNG

Feast of DP meanings

The Essential Computer Dictionary and Speller, by Charles J. Sippl. With JoAnne Coffman Mayer. £9.70. Prentice-Hall International.

DP 'PEOPLE' - and those who write about them - are constantly extending their vocabularies with the latest buzz-words, acronyms, and technical jargon.

For anyone whose job requires familiarity with 'computerese' or 'electrospeak' (these words, incidentally, are not part of the dictionary, but culled from the fly-leaf) this volume 'provides' a ready source of both spellings and meanings.

It defines more than 15,000

computer terms, and is illustrated with more than 100 pictures.

Much of the information will be familiar; hands up all who know what is a 'variety' or a 'Proportional'?

And if you thought that 'smudge' was an acronym for the latest in new technology, rest assured that, according to Sippl, it is nothing more than 'an optical character recognition ink that is some place it doesn't belong'. Did we really need to be told that?

From such explanations, readers will have gleaned that the authors are American. Hence some slightly unfamiliar spellings ('defense',

'fiberoptics', 'signaling').

Sippl is a computer industry consultant, and was the author of 'Computers for the Businessman' (for the Bantam Press) and 'Data Processing at Palomar College' (for Marcas, California).

Whatever unfamiliar words and spellings they have come up with, this volume could well prove to be an essential reference book. We also would the review copy be found its way to Computer Weekly sub-editor's desk?

Of course you all know that a reference is a 'variable' attribute in a database whose value is controlled by a 'current' value, and 'Proportional' is a blank's proper control system.

Mine of standards information

Programming Language: Standardisation, ed. I. D. Hill and B. L. Meek. 261 pp. Ellis Horwood.

PROGRAMMING language standards are usually encountered in the context of a particular language or software system. While such standards are obviously valuable, much confusion arises from the different standards organisations and the

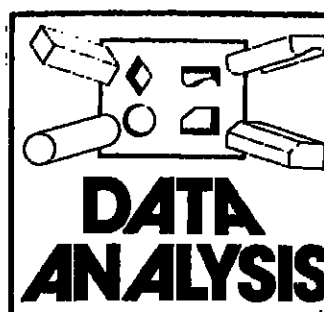
relationships between them, how standards are developed and the ultimate purpose of standards activities are often unclear.

This book fills in the background by supplying an admirably clear and comprehensive introduction to the whole subject. Part I discusses particular software standards. An introductory chapter on the standardisation process is followed by detailed accounts of the

standardisation of Fortran, Cobol, Algol 60, PL/I, Basic, and Pascal. Part II consists of a wide-ranging 'discussion' of standardisation issues, constructed from written comments by the authors and others.

The book is a mine of standards information, covering philosophical discussion and references to the literature.

PETER WALLIS



PART 14 of the series described the technique of access path analysis, a method of determining and documenting the types of entities and relationships involved in a function.

In order to perform access path analysis we had first to identify the "elementary functions" and then to draw functional models describing them. Access path analysis has several purposes, two of which - the checking of the entity model and the provision of the facts for database design - will be explored in this article.

Documentation

To help the database designer, not only must the access paths and entry points be determined for each function, but quantifiable facts must be available on the frequency of the activity on the data.

In other words, it is not enough to know that the patient entity type is accessed, unless it is also known how often it is accessed, 500 times per day, 200 times per month, etc. When designing a database only a certain number of access paths can be made efficient, hence the most important functions must be established and frequency estimates made. All the basic facts are available to provide this information - it only requires that the data be summarised.

The "Access Path for a Function" documentation form is shown in Figure 1, filled in with the example used in previous articles, the "Handle Patient's Death" function.

In Part 10 the function "Handle Patient's Death" was described and the form used to document functions was shown. It can be seen that the frequency of the function was documented. It is this figure that is used to make the Frequency Assumption (7) on the form.

The Response Required (6) is that required by the user, e.g. he may be prepared to let it wait for a day, it may be urgent (because it affects other functions), or it may be so infrequent and unimportant that the response required may be "within a week".

Access path for function form

The description from the function form, the data flow diagrams and the function hierarchy are all used to perform access path analysis. The steps used to draw the function models were explained in Part 14. The access path for a function form is filled out at the time the function models are drawn. It is achieved as follows:

1. The description of the function is worked through and each entity type and relationship type listed in the order in which they are likely to be involved.

2. The action on each entity type is recorded. The following symbols are used to denote the permissible actions:

M - Modify (one or more attributes of the Entity)
R - Retrieve
C - Create
D - Delete

In our example the attributes of the entity type Patient have been

A. An entity of type Patient is always related to a maximum of 3 entities of type Operation sometimes (80%) a minimum of 0

B. An entity of type Operation is always related to a maximum of 1 entities of type Patient sometimes (%) a minimum of 0

Figure 2

More complex functional models

Section I - Part 15

of our series describing a system design methodology

by Rosemary Rock-Evans

modified (M) and Operation and Appointment have been deleted.

3. The action on each relationship type is recorded. The following symbols are used to denote the permissible actions:

C - Connect (add a member to a relationship)
D - Disconnect (delete a member from the relationship)
T - Transfer (disconnect a member from one relationship and simultaneously connect it to another of the same type)

ties of different types. An example is shown in Figure 2 where an "Illness" entity has been found by the intersection between two entities - Patient and Type of Illness.

5. The Volume figure always describes the number of entities of the entity type which are accessed per function, NOT per month, or per day, etc. The per month or per day volumes are calculated later.

Thus, in our example the function "Handle Patient's Death" handles one patient at a time. To calculate the volume of other en-

50% of Appointments have been completed, the task of Cancelling the Appointments would on average involve 3 Appointments. Maximum figures can be used as well, if desired.

The Access Path Forms will be discussed in detail in later parts of the series, when database design considerations are covered. It can be seen, however, that knowing the response required, and details of the frequency of functions, provides the database designer with very useful information.

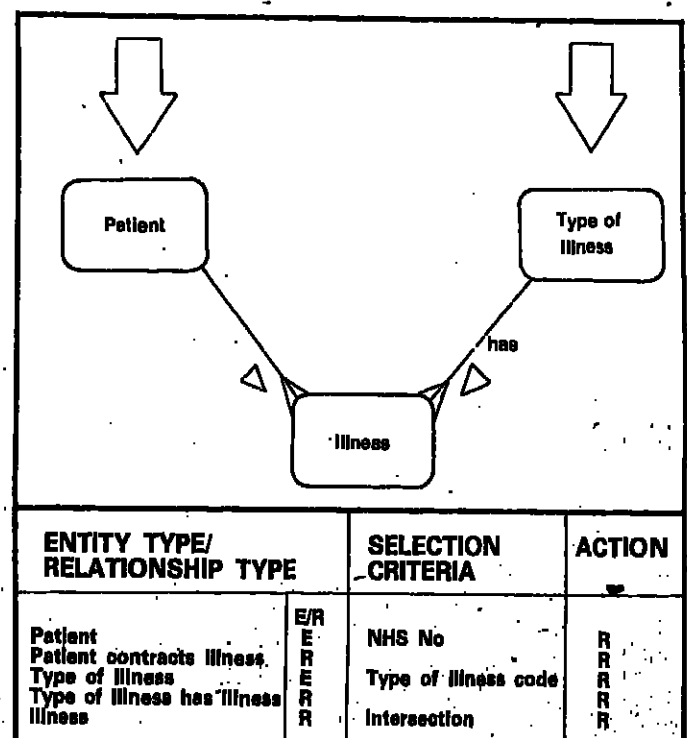


Figure 2. "Intersection."

R - Retrieve (implies use of relationship type only)

4. The selection criteria used to access an entity type are recorded. Selection may be made via:

a) The attribute 'types' which constitute the key of the entity type, e.g. in the example, the NHS number is the key of the Patient entity type.

b) The key and other attribute types, e.g. if a range of keys was known but further selection was to be made.

c) Attribute types other than the key, e.g. All Males (sex code) over 50 (date of birth).

Where entities of one type are accessed via a one-to-many relationship type with an entity of another type, it is said that the single entity is the owner and the many entities are the members.

The term 'intersection' is also used, when an entity or entities of one type are retrieved by using the relationships with two other en-

ity types accessed, two methods are available:

a) The figure can be completed by talking to the user and/or

b) The information provided on the relationship type forms can be used.

The Relationship Type Form was discussed in Part 5. In this form the maximum, average and minimum degree of the relationship were documented as shown in Figure 3 (the example is of the relationship type "Patient Undergoes Operation").

Using this information, we know that for every Patient who actually undergoes an Operation, the average degree is 1.4. Assuming that 50% of those operations are in the past and 50% in the future, the task of "Cancelling Operations" would, on average, involve two Operations for every Patient. The Volume field in the Access Path Form has thus been set at two.

The same process can be performed for an Appointment. Assuming the average degree is 1.6 and

Temporary entities

Access path analysis occasionally leads to the discovery of entity types which have not been identified in the earlier stages. It is possible for entity types to be created and destroyed during the execution of an elementary function, making the entity type so temporary that it may not have been identified until the function has been examined in depth.

Temporary entities can be as important as the more permanent entities which are used by more than one elementary function, and must be documented and shown in the model.

It is often found that these temporary entities have attribute types, which under the old systems

FUNCTION ANALYSIS DOCUMENTATION ACCESS PATH FOR A FUNCTION

1. Analyst: R.R.E.		5. Function name: Handle Patient's Death			
2. Date: 1/1/80		6. Response req'd: Online (Immediate)			
3. Version: 001		7. Frequency assumption			
4. Status: Draft		40 max per month, 40 aver per month/growth 0%			
Entity type (E) relationship type (R) - Accessed		Selection criteria	Action	Vol	Notes
	E/R				
Patient	E	NHS No (Key)	M	1	
Patient undergoes Operation	R		R		
Operation	E	(member) operation date	D	2	
Patient makes Appointment	R		R		
	E	(member) Appointment date	D	3	
Patient has Patient's Medication	R		R		
Patient's Medication	E	(member) Active Medication	M	2	
Patient has Ward Bed	R		R		
Ward Bed	E	Owner	M	1	
Notes					

Figure 1.

design methods might have been found in the working storage section of a program, or in "transaction files". These entity types are not transaction files, however, nor entity sub-types. They have their own unique attribute types and definitions: for example, in a payroll system the Salary/Wage Payment entity type, i.e. what the employee received as pay in the week, may only exist for the event "Pay Employee" and then be archived.

This article has covered a path analysis documentation of the functional model. In the part of the series the Access Analysis Forms will be used to summarise the functions' entity types.

The Data Analysis method was developed at CACI by Palmer.

Decisions to be left

Decisions on which attribute types and entity types are to be made permanent and which temporary should be left until all the functions have been analysed. The

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The major marketing, administration and accounting offices are also based at Enfield and are linked to the Company's ICL 2900 installations throughout the U.K. The department provides a computing service to all parts of the Division covering payroll, material control, sales and finance and is constantly working to improve the efficiency of the organisation by the introduction of automated systems. The department has recently taken delivery of the latest ICL 2945 computer with a memory of one megabyte. It is capable of supporting the on-line network of video terminal screens situated on the Enfield and Gosport sites.

SYSTEMS ANALYSTS

We have a requirement for Systems Analysts with at least five years experience preferably gained in a commercial or industrial undertaking who have had the responsibility for the implementation of a medium size system. The ability to communicate easily with persons at all levels and understand and solve the individual problems related to the many and varied activities on site are essential personal qualities.

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THE UNIVERSITY OF LEEDS

SENIOR SYSTEMS ANALYST

ADMINISTRATIVE DATA PROCESSING SECTION

Applications are invited for a post of SENIOR SYSTEMS ANALYST in the Registry to lead a team of eight analysts and programmers maintaining and developing a wide range of applications for the Central Administration of this large University.

Applicants should have not less than five years' sound commercial experience in systems analysis and programming and should have a particular interest in applying modern computer technology to a changing office environment.

The Data Processing Section's operations are based on an ICL 2904/50 Computer using JCL and is developing a network of VDU office links through 7602 terminals. This is a demanding post requiring a candidate of high calibre and with real enthusiasm.

Salary on the Administrative Scale II (£9,220-£11,575) (under review).

Application forms and further particulars may be obtained from the Registrar, The University, Leeds LS2 9JT, quoting reference number 119/29. Applications should be submitted as soon as possible and no later than 12th February, 1981.

Education Department

County Adviser for Computer Education

Applications are invited for this newly-established post. Candidates should have teaching experience in Secondary Schools and their qualifications should include some knowledge of Computers. The Adviser will be responsible for advice and support in the field of computer education, including the use of computers across the curriculum, throughout the schools and colleges of the Authority.

The Adviser will receive an essential car users' allowance. The County has a scheme of financial assistance covering removal and relocation expenses.

Application forms and further particulars may be obtained from the Director of Education, County Offices, Heddon, Derbyshire DE4 3AG, to whom completed forms should be returned by February 13, 1981.

DERBYSHIRE
County Council

South Eastern Health Board

SYSTEMS ANALYST GRADE VI

LOCATION: Kilkenny City (Ireland)

At least two years in a data processing environment, including some programming and supervisory experience, together with experience of systems analysis and design, including the successful implementation of at least one project.

SALARY SCALE: £13,387 - £14,400 annual increments to £15,284 per annum.

Application form and particulars are available from: The Personnel Officer, South Eastern Health Board, Head Office, Leeson Road, Dublin 2, Ireland, to whom completed application forms should be returned not later than 5.00 p.m. on Monday, February 16, 1981.

ROCHFORD DISTRICT COUNCIL

COMPUTER MANAGER

The Council has agreed to set up its own Computing Centre.

Applications are invited for the above post which is likely to command a salary circa £13,000 + attractive benefits.

Applications are required by 6th February, 1981. Further details obtainable from: Arthur G. Cobbs, IFA, FRVA, Chief Executive, Rochford District Council, South Street, Rochford, Essex SS4 1BW. Tel: Southend 546366, Ext. 280.

OVERSEAS VIA I.A.

SYSTEMS PROGRAMMER required to work on an IBM 4341 running under OS/VS1 using CICS, VSMA, VTAM etc. The work will involve general maintenance of the systems, housekeeping and file maintenance. Knowledge of the Dutch language advantageous. Location: The Netherlands

ANALYST/PROGRAMMER required to program in ASSEMBLER on MINI hardware. Work involves the development of scientific X-ray application systems. Location: The Netherlands

SENIOR SYSTEMS ANALYST/PROGRAMMER required with a good knowledge of DL/I and COBOL. Hardware in use IBM 4341 running under OS/VS1 and CICS. Knowledge of the IBM package COPPLIS applications to be worked on include an on-line production/inventory control system and other materials management modules. Location: The Netherlands

MINI/MICRO specialists required to write USER REFERENCE MANUALS for a new range of MICRO's being developed. Location: Vienna

SYSTEMS SOFTWARE ENGINEER required with an in depth IBM UTILITIES knowledge to work on an IBM 4341 running under OS/VS1 using CICS, MVS, TSO, VTAM, MVS etc. Location: France, good knowledge of the French language essential

SENIOR COBOL PROGRAMMER with program design experience in business applications to work on a new dedicated machine. Small business computer experience essential. Location: The Netherlands

ANALYST PROGRAMMERS and TEAM LEADERS with excellent COBOL, are required to work on the conversion of a number of systems to IBM hardware. Other D.P. languages required are RPG II, FORTRAN and ASSEMBLER. Applications range over scientific, engineering and petro-chemical subjects. An in-depth knowledge of any of the following IBM UTILITIES will be advantageous: CICS, TSO, VSAM, VTAM and FOURMOST. Location: The Netherlands

ANALYST PROGRAMMERS with experience of REAL-TIME TELEPHONE SWITCHING software. Location: Paris

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Salary will be within the range £2805-£2895 of the Lecturers' scale of £2805-£1575, with placement according to age, qualifications and experience.

Further particulars may be obtained from the Secretary of the University of Glasgow, Room 18, University of Glasgow, Glasgow, G12 8QQ, with whom applications (in triplicate, giving the names and addresses of three referees) should be sent on or before February 27, 1981.

In reply please quote Ref. No. 4785.

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Britain's biggest computer newspaper needs two specialists to strengthen its software coverage and write general news stories.

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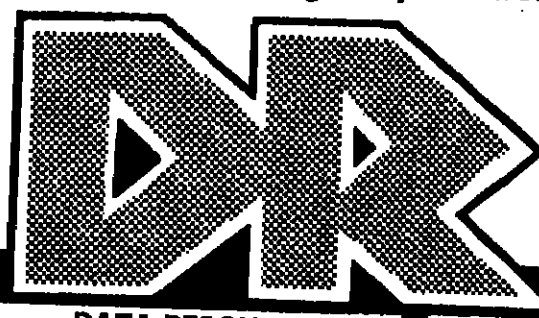
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DEPARTMENT OF COMPUTING
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The appointment is for three years, to begin as soon as possible, at a salary in the range £4,700-£5,246 plus 1987 London Allowance.
Further details from or applications to Dr. J. Derrington, Department of Computing, Imperial College, 180 Queens Gate, London SW7 2BZ. Tel: 01-856 6111, Ext. 2701. (4221)

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The increase in business now concluded for 1981 and beyond, is in stark contrast to the lack of growth currently being experienced by some areas of the computer services industry. The immediate result is that the number of professional staff will be substantially increased, since the new business will provide on-going project work for successful candidates.

Career Prospects

In view of the growth factor and the way in which our clients assign staff to project work, there is no doubt that there will be progressively more room for extremely senior consultancy and project management positions as time passes. Additionally, our clients approach to project control and system design is entirely modern and exposure to these methodologies is certain to enhance and increase individual professional capabilities.

Salaries

£10,500-£13,500 range, although a few more senior positions are available. Naturally, additional benefits such as a pension scheme, free BUPA, interest free season ticket loans etc also apply.

Location

The Company H.Q. is in the West End of London, so although most appointees may be working on site in the N.W. Home Counties for most of the time all candidates must be prepared to work in London. Full relocation expenses will be available if necessary.

Systems Analysts

These positions equate more readily to "Senior Analysts" positions in general and would therefore be suitable either for individuals already at Senior Analyst level looking for a move to consultancy work or for individuals who feel they are ready for promotion.

- Essential expertise must be thorough experience of establishing and defining user requirements.
- First-class communicative skills, both oral and written, will naturally be expected from all candidates.
- Knowledge of modern analytical methods, such as data analysis, would be a major asset although not a pre-requisite.
- Machine and software backgrounds are not relevant at this stage but experience of on-line systems is absolutely essential - preferably for large multi-user and multi-site systems.

Systems Designers

(Incl. Comms & Software)

A broad range of skill requirements exists within various design teams, providing opportunities both for designers with a leaning towards software and for Analyst/Programmers who have not moved into pure analysis roles.

The technical areas of particular interest are:-

- Communications Systems Design - including message switching, voice network, traffic pattern and work load pattern establishment etc.
- Software Design and Programming - development work on both operating systems and communications interfaces.
- On-line Systems Design - experience of man/machine interfacing and terminal based systems is essential.
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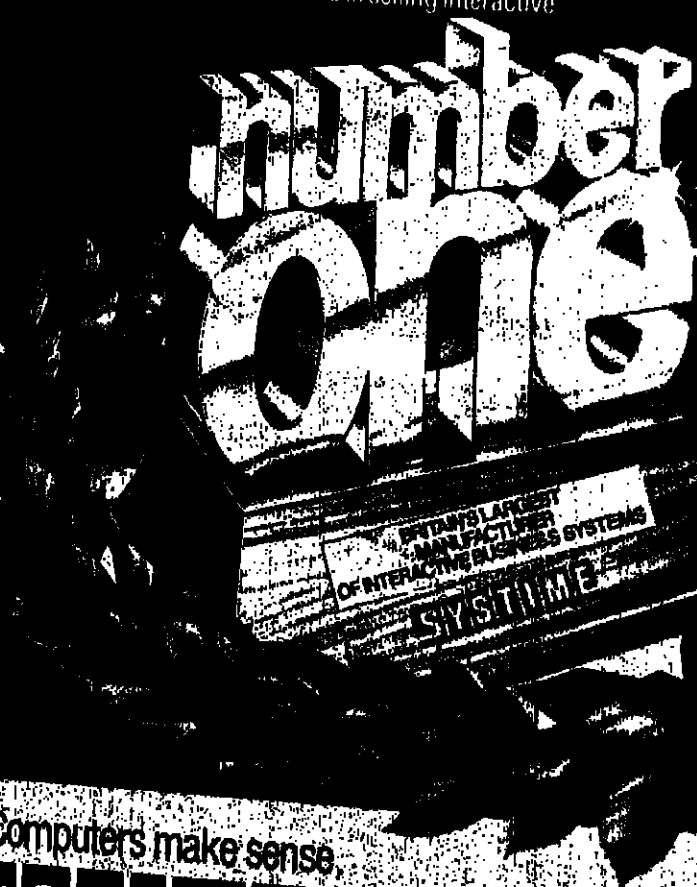
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Cornwall Education Committee
CORNWALL TECHNICAL COLLEGE, REDRUTH
PRINCIPAL: Dr. K. Farnell
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Applications are invited from suitably qualified persons for the post of:

Senior Lecturer in Micro-Electronics

This is a senior post covering all aspects of micro-electronics on a broad front, ranging from the engineering aspects of system design to software development in the fields of Data Processing and Control Engineering.

The successful applicant will be expected to be well qualified, particularly in electronic engineering, and have had significant 'hands-on' experience of modern micro-processor based systems.

SALARY: SENIOR LECTURER
£9,962-£10,639 (year) - £11,295

Further details and application forms may be obtained from the Principal to whom completed forms should be returned within three weeks of the appearance of this advertisement. S.p.e. please.

Cornwall

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SOS.....DOS/VS.....West London

Super Opportunity for Supervisor, Shift Leader and Operator

to strengthen the existing operations team of a major West London Installation

A two megabyte IBM 3031, running under DOS/VS and POWER/VS is utilised, but software will be upgraded to DOS/VSE and VM in the near future. Database facilities are provided by DL/1 and the teleprocessing system runs under CICS.

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An experienced DOS/VS shift leader is required, preferably to lead a team of 4 operators working in a two shift rota between 7.30am and 10.45pm. A minimum of 2 years DOS/VS experience is required, preferably gained in an on-line environment. Training in DOS/VSE and VM will be provided as necessary.

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Minimum of 1 year's DOS/VS or VSE experience. Additional training provided.

For further information please write to, or telephone Pat Barnes (24-hour answer service) quoting ref CW102-1P

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SHAPE TECHNICAL CENTRE THE HAGUE (HOLLAND)

SHAPE Technical Centre - a NATO Research Organisation - has a vacancy for a

SENIOR SYSTEM PROGRAMMER

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for its Control Data Cyber 740 computer system. The successful candidate should have broad experience in data processing with at least three years in systems programming for a CDC Cyber/6000 computer system.

Good knowledge of programming in high-level languages and macro-assembler at the operating system level is required.

Starting salaries will depend on qualifications and experience and may be increased dependent on the family situation.

Applicants (NATO nationals only) should send a brief personal résumé to Personnel Officer, SHAPE Technical Centre, P.O. Box 174, 2501 CD The Hague, The Netherlands.

(4207)

IBM MVS SYSTEMS PROGRAMMERS

For DOS/VSE - MVS Conversion

DOS/VS/E
c. £13K
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We at Independent Software Support require in-house Systems Programmers for our expanding support Group.

You will have about 3 years' DOS/VS, DOS/VSE experience and be looking for a more rewarding and challenging future.

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Chief Technical Programmer, £12-£13K. Must be able to lead up and motivate small team.

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Senior Programmer, IBM, Cobol, CICS, good prospects for advancement within company, £8K.

For more information please get in touch with Sam at 089, tel. 01-437-4704 or write to: Independent Software Support (UK Division), 217/218 Tottenham Court Road, London, W1P 0AP.



PROGRAMMERS

MUST HAVE COBOL DL/1 experience. CICS an asset. To suit Feb./March 1981.

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Please submit Detailed CVs.

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POLYTECHNIC OF THE SOUTH BANK

Department of Mathematical Sciences and Computing

PRINCIPAL LECTURER IN COMPUTING

(Ref. X12)

LECTURER II/SENIOR LECTURER IN COMPUTING

(Ref. X13)

AND TEMPORARY LECTURER II IN COMPUTING

(Ref. X14)

A Principal Lecturer is required for April, 1981, and Lecturer II/Senior Lecturer for September, 1981, to teach Computing in the Department of Mathematical Sciences and Computing. This is a lively department, able to offer excellent career opportunities in most areas of the subject. It provides a range of professional Computing courses at both undergraduate and postgraduate levels, and is currently expanding into Computer Education. It is strongly associated with the Microcomputer Advisory Centre for the Polytechnic.

The Principal Lecturer is required in order to assist course development and encourage research and consultancy work. A higher degree in Computing is essential together with research and teaching ability and administrative experience in education and/or industry. The Lecturer is available to specialists in either Computer Science or Data Processing.

The Lecturer II/Senior Lecturer is required to teach and assist in the administration of the department's courses. Candidates should possess a degree in Computing or a subject specialism which includes Programming. Teaching experience is desirable but not essential.

The Temporary Lecturer II is required as soon as possible, the appointment terminating on August 31, 1981. This position would involve teaching Computing and providing a small commitment to the Microcomputer Advisory Centre. Candidates should possess a degree in Computing and a subject specialism which includes Programming. Teaching experience is desirable but not essential.

Salary scales:
Principal Lecturer £10,500-£13,245
Senior Lecturer £8,952-£10,500
Lecturer II £6,012-£9,702
Plus £768 (London Allowance)

Application form and further particulars available from Staffing Office, Polytechnic of the South Bank, Borough Road, London, SE1 0AA (Tel: 01-428 8888, Ext. 2022).

Closing date for the receipt of completed applications: February 23, 1981.



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U.K. SALES MANAGER to establish and operate from a new office in the West London area.

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MILITARY/SCIENTIFIC Analyst/Programmers and Programmers, Fortran/Cobol/Assembler on minis required by London-based Systems House for European and UK assignments on scientific and military contracts. Mobility essential. £7.5-10K	COMMS NETWORKS Analysts (3-5 years' in TP or on-line environment) sought for new networking/comms projects in Bucks and Central London. Of particular interest: message switching, access controls, user definitions, etc. £8-13K	PL/I HOLLAND Programmers & Analyst/Programmers with 3+ years' PL/I, ideally with some TP and DB knowledge required by Administrative headquarters of leading oil company in the Netherlands. £12-16K
COBOL IBM & HP Analyst/Programmers, 2+ years' in commercial environment and COBOL programming on IBM 370/4300 or HP equipment, required for Commercial Systems Group of Major Oil Company, at their West House, London base but initial term overseas (c. one year). Excellent overseas allowance. £8-11.5K	SYS. DESIGNERS COMMERCIAL Senior Systems Designers with 5 or more years' experience in the design and implementation of large on-line commercial systems (IBM) plus specialist knowledge of IMS needed by British Software House, London base but initial term overseas (c. one year). Excellent overseas allowance. £9-11K	
DATA BASE SPECIALIST Data Analysts - IMS specialists who have experience in systems design and implementation required to fill technical specialist role and applications consultant positions at advanced User Installation in Herts. c £13K	PROCESS CONTROL Programmers and Analysts with 3+ years' mini or micro Assembler (DEC in particular) experience plus relevant (i.e. scientific) degree required for producer of Industrial Control and Automation Systems, Offices in Herts. £7-10K	SOFTWARE ENGINEER Hardware and Software specialists with good micro knowledge required by Micro Manufacturer to provide software implementation and support service from London base. Wide-ranging applications. c £10K
HOLLAND GERMANY Analysts, Designers and Programmers with real-time control experience on minis or micros (Assembler level) wanted to join European branches of Systems House specialising in the automation field. Generous relocation, some positions offering car. £13-18K	MIDDX COBOL Programmers, Analysts and Team Leaders with COBOL experience and, ideally, some knowledge of structured programming techniques required to meet expansion plans for development centre of leading manufacturer. Degree preferred. Commercial/financial applications experience necessary. to £10K	

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Computer Service Engineer SAUDI ARABIA

Saudi American Bank, an affiliate of Citibank, is currently undergoing a major expansion of its on-line real time data processing facilities. A computer service engineer is required to assist the resident senior engineer in the maintenance of main frame and terminal equipment. The successful candidate must possess a minimum of 3 years' experience in the maintenance of on-line real time data processing equipment. The position is based in Riyadh, but travel to installations throughout the Kingdom of Saudi Arabia will be required. The successful candidate will be offered:

- An attractive tax-free salary.
- Free furnished accommodation.
- One month's paid leave each year with paid airfare for family members to visit.
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- The selected candidate will be offered a contract which will be renewed automatically.
- Applications with CVs should be addressed to: Mr D.T. Faruqi, c/o Saudi American Bank, P.O. Box 833, Riyadh, Saudi Arabia.

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Targa

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SYSTEMS AND PROGRAMMING

CITY ANALYST (BANKING) C. £11,000

One of the most successful Merchant Banks in the City is looking for a SYSTEMS ANALYST to join a steadily expanding department. Development of systems for new areas of banking operations has created the need for a person with at least 2 years' experience in Analysis who is a good communicator and has a background which includes, ideally, some ORGANISATION AND METHODS. The usual BANKING FRINGE BENEFITS will apply. Ref: R3200

MIDDLESEX RPGII PROGRAMMER/ANALYST C. £9,000

A well-known multi-national in the electronics field is looking for a person with around 18 months-2 years' RPGII experience. The experience will have been gained in an IBM environment as our clients are major users and include SYSTEM 3, 34, 370 range and also 4300 equipment. An ESSENTIAL qualification for the successful applicant will be substantial INVENTORY CONTROL experience. Great package and EUROPEAN travel opportunity. Ref: R3175

MIDDLESEX SENIOR ANALYST/PROGRAMMER C. £10,000

A major name in the Distributive Trades is embarking on a major overhaul and redefinition of its systems. To assist with this development they need a person with PROJECT LEADING potential. The favoured career profile will include a MINIMUM of 2 years' COBOL programming followed by ANALYSIS or TEAM LEADING in a DOS/VSE environment. An excellent opportunity. Ref: R3183

WEST END PROGRAMMER/ANALYSTS £6-11,000

A distinguished OIL COMPANY with offices in the West End needs a number of Programmer/Analysts to assist with new development. Self-motivated candidates with a good NUMERATE DEGREE and FORTRAN programming experience are invited to apply. A knowledge of OPERATIONS RESEARCH techniques gained in an IBM environment would be particularly advantageous. Ref: R3188

ICL 1900/2900 OPERATOR C.£6,000+

A well-known company in West London have a requirement for an Operator for their site which comprises both ICL 1900 and 2900 hardware. The necessary prerequisites are a very good knowledge of both GIs and VME/B. The company provides excellent opportunities for career advancement and further training together with very good staff benefits. Ref: R3180

Targa are always pleased to hear from experienced Systems, Programming or Operations staff. If your career needs a boost, contact the office for an informal discussion with one of our consultants.

TARGA COMPUTER SERVICES
6 Liverpool Street, London, EC2M 7NH - 01-283 9941

TEXACO

MVS Systems Programmer

Texaco Limited plans to convert its 2 x 4341 systems from DOS/VSE to MVS. The feasibility study will start very soon and implementation should commence mid-1981. The complete process is expected to take two years: one to plan and create the operating system, and one to convert the applications.

We therefore need one experienced MVS person to join our team of five, who with the support of consultants' staff will be responsible first for planning and setting up the new system, and then for keeping it working smoothly and at an advanced technical level.

The job will be important, interesting and challenging. Salary, depending on experience, will be in the range £8000 to £12000, plus the usual Texaco fringe benefits.

If you are interested, please contact:
Mr R. Stonehouse,
Manager, Technical Support,
Texaco Limited.

1 Knightsbridge Green, London SW1X 7QJ
Telephone: 01-584 5000

UNIVERSITY OF SOUTHAMPTON NUMERICAL ANALYST

Applications are invited for the post of Numerical Analyst within the University's Computing Service. The successful applicant will give a supporting advisory service to computer users in numerical methods as applied to the fields of engineering and applied science, and in the techniques of mathematical modelling.

The University has access to very powerful computing facilities and a wide range of different machine architectures. The applicant will be expected to give advice on the suitability of different numerical methods for the various computer systems available. He/she will be especially concerned with the exploitation of new machine architectures such as vector and array processors.

Applicants should normally possess a post-graduate qualification in numerical methods or a first degree with a large content of numerical analysis. Experience of the application of numerical techniques to practical problems is highly desirable.

Salary will be within range £8,151 to £24,788 p.a. Starting point, according to qualifications and experience. Applications (2 copies) giving details of birth, curriculum vitae, and the names and addresses of two referees should be sent to: Mrs. P. Vaughan-Smith, Staffing Department, The University of Southampton SO9 5NH, from whom further details can be obtained. Please quote Ref. 1770A/CV.

BOX NOS.

Box number refers should be addressed to:
Box No. 1: Mr R. Stonehouse, Manager, Technical Support, Texaco Limited, 1 Knightsbridge Green, London SW1X 7QJ.
Box No. 2: Mr R. Stonehouse, Manager, Technical Support, Texaco Limited, 1 Knightsbridge Green, London SW1X 7QJ.

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Our clients are expanding their DP services to cope with the development of major new systems and the installation of a modern mainframe. Database, on-line and financial modelling techniques are used, and remote minis with communications links are planned. We have been retained to recruit for the following posts:

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Sound commercial analysis experience (probably over five years) and good leadership qualities are required, ideally with knowledge of database and communications. (Ref. 328CW)

SYSTEMS ANALYST £7,500-£8,500

This will interest analysts with upwards of two years' solid experience of commercial and accounting systems, ideally including some financial modelling. (Ref. 329CW)

PROGRAMMER £6,500-£7,500

The requirement is for at least two years' COBOL, on any hardware, ideally including mainframe on-line applications. (Ref. 330CW)

Working conditions are first-class (purpose-built computer centre), and career prospects in a successful, thriving organisation are good. There are valuable fringe benefits, and in certain circumstances generous relocation expenses will be offered.

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THE PERSON 2-3 years' experience of commercial application programming in DEC BASIC + under RSTS/E and the ability to liaise with clients.
THE JOB Converting functional systems design to computer systems design, implementing tailor made customer systems, and adapting standard packages to users requirements.
THE REWARD A top salary, a swift and clear promotion path within a respected and established multi-million turnover group based in London but with provincial offices. Big company perks and travel and accommodation allowances when working away, plus many other benefits.

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THE PERSON 3-5 years' experience of on-line IBM COBOL using VSAM and CICS, the ability to control a team of 3-4 programmers.
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THE REWARDS £10-11k per annum plus non-contributory pension, life assurance, BUPA. Beneficial mortgage scheme, LVs, bonus and recreational, holiday and sporting facilities.

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Charles Barker Confidential Reply Service

Please send full career details and list separately companies to which we should not forward your reply. Write the reference number on the envelope and post to our London office, 30 Farringdon Street, London EC4A 3EA.

Senior Systems Analyst/Programmer

London North East/Borders of Essex
Salary from around £8,000

Our Client is seeking a Senior Systems Analyst/Programmer, who will report to the Data Processing Manager.

Duties will involve the provision of technical knowledge for all in-house computer systems, analysis and programming of minor systems changes, and assisting with the extension or replacement of current systems as necessary.

Applications are invited from those experienced in Cobol RPG programming and who are conversant with IBM Model 34. Candidates must have had some formal training, at least one year's systems analysis experience and a minimum of three years' programming experience. Some experience of application within the insurance/broking environment would be an advantage.

Ref: 1693 (4224)

Senior ATE Programmer

SALARY c.£10,000

IAL is a major name in the data communications field, developing advanced microprocessor systems to the highest standards. The Quality Control department now needs to appoint a Senior ATE Programmer. You will be required to liaise at all levels, both within the company and with clients. For this, you must have a thorough knowledge of digital and analogue systems, experience with ATE and understanding telecommunication principles. A minimum of 4 years' experience in electronics, backed with an HNC or equivalent, is essential. If you have a background in the RPI/F electronics field, it would be a distinct advantage.

IAL Benefits include 4 weeks' holiday plus bonus, staff restaurant, social club, pension scheme and life assurance. Salary is dependent upon qualifications and experience and relocation expenses will be paid where necessary.

Please apply quoting ref. number K/014 to Sue Dillon, IAL, Aeradio House, Hayes Road, Southall, Middx. Tel: 01-534 5134.



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JBA

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London based up to £15,000

Experienced Systems Designers are required immediately by our client, a leading computer consultancy, to take a key role in the design of a large real-time communications system.

Applicants should have at least six years in the design of mainframe applications and be capable of selecting hardware/software/packages for inclusion in a system. Direct involvement with database (DBMS), graphics or communications would be an asset. Excellent salaries according to experience. Contact: Jim Baker

Designers and Consultants

Surry c. £13k + Benefits

A newly founded systems company, specialising in information security products and services, require top level professionals already involved at the forefront of advanced computer and communications technology.

As a senior member of a project team, you will be developing: MICRO BASED SYSTEMS, TRANSACTION PROCESSING SYSTEMS, SECURE DATABASE AND NETWORK SYSTEMS and be working on PATTERN RECOGNITION and IMAGE PROCESSING. Knowledge of RSX11M, Assembler, PASCAL and the Z80 micro, are some of the qualities sought.

An attractive benefits package supports the excellent salary. Contact: Brian Postles

Senior Analyst/Programmer

City £9,500 - £12,000

The Management Services Department of this international bank wish to appoint an experienced Analyst/Programmer to help develop and implement new banking systems for use throughout the world. Candidates must be well educated, have a sound programming background and proven analytical skills, preferably gained in a financial environment. Knowledge of IBM System 34 and RPGII would be a distinct advantage. A good salary is coupled with all the usual banking benefits. Contact: Isobel Bruce

Analyst/Programmers

London up to £11,000

We have been retained by an international energy company to recruit experienced Analyst/Programmers to join their Commercial Systems Group specialising in the development of business related computer systems on the IBM 4341 and HP3000 mini-computers.

Ideally applicants should be graduates although 'A' level education qualifications will be accepted. Successful candidates should have a minimum of two years' experience in commercial applications together with at least one year's experience programming in COBOL gained on either the IBM 370, 4300 or comparable Hewlett Packard machines. An excellent salary together with good fringe benefits complete an attractive package. Contact: David Hendry

Systems Programmer

London £9,500

This is a good opportunity to join a well established organisation who are market leaders in their field, and gain some valuable experience.

A minimum of one year using MVS or OS with knowledge of some or all of the following VTAM, CICS, IDMS or RACF. Fluency in Assembler would be an advantage as would exposure to VM.

Consideration will be given to more experienced applicants and of course the salary adjusted accordingly. Contact: Janet Chivers

Senior Programmer

City £9,000

It is essential to have at least three years' experience in PL/I preferably working in a team environment and involvement to a high degree in the implementation of medium sized systems. Knowledge of CICS, IDMS and real-time systems would be a definite advantage. Excellent prospects can be offered by this international organisation who are currently involved in a major development plan, including the upgrade of hardware, to enable them to utilise the latest technology. Contact: Janet Chivers

Engineering Support Specialist

Berks c. £7,500

A leading manufacturing organisation with plants and offices throughout Europe wishes to recruit a Senior Technical Specialist to take responsibility for a new Engineering Services Group. The new function will provide Engineers and Users with local d.p. facilities using time sharing, packages or minis from an existing network.

Candidates, preferably graduates in Computer Science, must have at least 3 years' experience in computing and be competent programmers. A background of Engineering Systems/packages, modelling and programming would obviously be an advantage. Ability to work closely with users is essential. Opportunity for travel. Contact: Jim Baker

Junior Software Technician

West London c. £6,000 + Car + O/T

Following considerable gradual expansion, our Client, a market leader in mini and micro business systems, wishes to strengthen their engineering division with a mobile software technician.

A thorough understanding of file based systems, operating systems and diagnostics are the main qualities required. This is a junior position but nevertheless an excellent opportunity to develop in a software role and move on to team leadership. Anyone already in the engineering area with a desire to move into software may also be considered. Excellent company package. Contact: Brian Postles

JAMES BAKER ASSOCIATES,
International Personnel Consultants,
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Tel: 01-438 9311

Job is 1/10

Mini/Micro Software

E.E.C. Pkg. to £16K

Programmers, Systems Designers and Project Leaders with in-depth experience of real-time systems are urgently required to join a number of project teams in Continental Europe. Of particular interest will be those candidates with a strong background in developing software for Communications or Process Control systems.

Whilst all applicants will be expected to be fluent in Assembler, Fortran, Algol or derivative languages, particular hardware expertise is not a requirement. All positions offered are on a permanent basis with relocation expenses and assistance in obtaining accommodation among the benefits our clients provide.

Ref: L5/A

Jnr. Assembler & PL-1 Progs

City of London Salary to £7.5K

A renowned Financial and Investment Consortium, long established in The City, currently requires Junior Assembler and PL-1 Programmers for its recently upgraded IBM mainframe and mini-computer installation. Suitable candidates should have a minimum of one year's Assembler or PL-1 applications programming experience.

sure, although in certain cases IBM COBOL will be considered. Applications areas include Property and Portfolio Management, Debt and Unit Trust Investment and Stocks/Shares Up-Date. In-house training and seminar courses will form an integral part of the education programme.

Ref: L5/B

Real-Time Programmers

Central London Salary to £9K

A leading Systems House, based in Central London, is seeking to employ additional Programmers to join its young, innovative software development team. Candidates should have a degree in a suitable subject and at least two years' real-time programming experience in either FORTRAN, CORAL 66 or Assembler. Knowledge of particular hardware is not important, but

exposure to mini computers, in particular DEC's PDP range, HP2100, Prime 500 or Honeywell Level 6, would be advantageous. These positions will appeal to applicants who enjoy working as a member of a small team involved in the design, coding and testing of real-time software.

Ref: L5/C

Management Consultants

City and West End Salary to £15K

Our clients have an enviable reputation as a Management Consultancy and Research Organisation. The Company is now seeking several additional Consultants and Senior Consultants. All candidates are expected to have good personal communication skills, be self-confident and highly presentable. Generally, preference will be given to graduates aged 28-34 years with

proven abilities to appreciate and identify business management and technical implementation problems. In particular, candidates with a knowledge of structured design techniques, data management, networking and VISWATA/PRESTEL applications are encouraged to apply.

Ref: L5/D

Process Control Programmers

Sth. London & Surrey Salary to £10K

A leading supplier of Industrial and Process Control Hardware and Systems Software is seeking to recruit Applications Programmers and Support Analysts for its U.K. Headquarters. All respondents must offer at least one year's experience in either Assembler or FORTRAN as a primary language whilst those with exposure to PASCAL, BASIC or COBOL will be

favourably considered. You will play a significant role in all stages of software and systems development from product planning to installation and live running. Since travel both nationally and internationally will form a significant part of the job function, mobility is an essential criterion for these positions.

Ref: L5/E

(4218)

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To specify detailed systems analysis of the requirements of Gibraltar Government, running the system and training others in RPGII to take charge of the System 34 Computer and 3742. Candidates should be citizens of the United Kingdom with experience in IBM System 34 Computer and RPGII. Age under 50 preferred.

Appointment for two years. Salary range £9,600-£10,500 per annum plus an allowance normally tax free in the range of £1,539-£3,618 per annum according to marital status. Gratuity 25% of basic salary.

Free family passages, subsidised accommodation, children's education allowances, etc.

For full details and application form please apply, quoting Ref: E318 and stating post concerned, and giving details of age, qualifications and experience to:



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We would like to hear from candidates with good experience of one of the following languages/machines: Cobol/PL/1/Pascal/Algol/Assembler/IBM OS and DOS/VS/370/134, 370/145, 3033, 4341, System 34.38/ICL 2800 series/PDP11 mini/GEC mini/L111/Wang 2200T VP. MIP & VLSI/Intel 8080, 8085, 8088 or 8086 microprocessors.

Please telephone Bernard Innes for an initial discussion and an application form or write in confidence giving full personal and career details quoting reference CW8111.

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Several of our clients seek experienced analysts with some user definition experience and a background of extracting the right information from a variety of people.

DESIGNERS/IMPLEMENTERS To £13,500
London

Our client, a pioneer in the Computer Services Industry, seeks graduates with a minimum of 3 years' good real-time, on-line experience with large mainframes - preferably ICL 2800+.

SYSTEMS DESIGNERS To £15,000 plus car
London and Bucks.

Our client, a pioneer in the Computer Services Industry, seeks applicants with considerable experience in the design and implementation of computer systems in particular of on-line systems and preferably with a knowledge of ICL 2800 series computers.

SENIOR CONSULTANTS Salary Negotiable
London

Fast-growing company in the Computer Services Industry seeks Senior Consultants who have a wide computer applications experience and are able to deal with clients at high levels of management. Applications from candidates with previous management experience are of particular interest.

Executive Recruitment Services
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56 Wootton Drive,
Hemel Hempstead, Herts, HP2 6LB
Tel: Hemel Hempstead (0442) 42418

**ANALYST/PROGRAMMER c. £7500 + benefits EAST LONDON**

The Barclays Unicorn Group, a leading Unit Trust and Life Assurance Company, has a vacancy arising from the expansion of its Development Team. This position will appeal to an experienced Cobol Programmer ready for a career move into Team Leadership or Systems Analysis. We use an ICL 19045 under GIL with an upgrade to a 2956 being planned. Also a large Data General Eclipse with IBM Main Memory supports 20 VDU's used for Online Data Capture and New Business Processing.

Applicants will need sound Cobol experience, a good academic background, and should be seeking the challenge of participating in our major expansion plans, on both Mini and Mainframe applications.

This opportunity offers excellent prospects with starting salaries, which are subject to review from April 1981, in the range £7000 to £7500 p.a., depending on experience. The fringe benefits are substantial including Non-Contributory Pension Scheme, Staff Restaurant and Luncheon Vouchers, a Profit Sharing Scheme and also a special House Purchase Scheme. If you are interested please apply in writing to:

B. L. T. Parker Esq.,
Administration Manager,
Barclays Unicorn Group Limited
Unicorn House
252/256 Romford Road, London E7 8JB
Telephone No: 01-534 8544

BARCLAYS UNICORN GROUP (4267)

UNIVERSITY OF LONDON COMPUTER CENTRE Programmer/Analysts in User Support

The University of London Computer Centre is a national centre and provides a computer service to the University of London and to Universities in the South-East and South-West of England. The Centre is currently equipped with Control Data 7600, 6600 and C-3200 72 computers and supports a large communications network of remote terminals and keyboard terminals. An exciting development programme is planned which will include substantial replacement of existing equipment in the early 1980s.

The User Support Group is the main interface between users and the computing services, and provides advisory, documentation, training and education services, compilers, graphics and applications packages and libraries.

A Programmer/Analyst is required to join the team currently engaged in the support of software in the graphics area. Applicants should preferably be graduates or post-graduate students with experience in graphics systems of use.

A Programmer/Analyst is required to join the team engaged in the administration of computer services. The range of the work is wide and would suit an applicant interested in contributing to the development of computer services for the University of London. A certain amount of liaison with computer users and suitable representatives would also be involved. Applicants should be graduates or post-graduate students with experience in computer systems and a willingness to communicate clearly both orally and in writing.

Ref: US81/1-2
A Programmer/Analyst is required to join the team providing the advisory, documentation and User Education Services. The work involves writing and editing applications or training materials for post-graduate students. Applicants should preferably be graduates or post-graduate students with experience in Fortran, Algol or Pascal and a willingness to communicate clearly both orally and in writing.

Further details and application forms are available from the Assistant Secretary, UCLCC, 25 Bedford Square, London WC1R 1EJ. Telephone: 01-625 3400.
Applications close 10.00 on the date of the advertisement.

Queen Alexandra Hospital Portsmouth

SYSTEMS ANALYST

for School of Nursing

A senior post working with the Senior Nursing Officer on a new project to automate plans for the continuous allocation of nurse learners to clinical experience in the various areas of hospitals and community, block teaching, and holidays, within the Portsmouth District; and to provide, implement and monitor these plans to meet the educational requirements of the General Nursing Council.

Skills as Systems Analyst/Programmer and an interest in Data Processing essential. Applicants should have a sound educational background, with definite evidence of numeracy ability, and be able to communicate effectively with hospital teaching staff, pupils and students.

Salary on scale £4834-£6312. Job description and application form from Personnel Officer. Closing date 16.2.1981.

Senior Auditor

ENFIELD, MIDDx. up to £11,000

The Audit Department of Eastern Gas carries out Audits throughout East Anglia and has three Sections engaged in operational, computer and contract audits on a modern systems appraisal basis. Suitable staff are given experience in all three Sections.

The Senior Auditor will be responsible for carrying out audits as a Team Leader and will be a qualified Accountant aged between 25 - 35, with at least one or two years post-qualification experience and a knowledge of modern audit philosophy and techniques. Preference will be given to candidates with data processing/systems analysis experience. Salary range £8,910 - £11,066 plus the benefits normally associated with a large progressive organisation, including where appropriate, assistance with relocation expenses.

Please write, not later than Friday 6th February 1981, quoting ref. 2553/CV, and giving full personal and career details to the Senior Recruitment Officer, Eastern Gas, Star House, Mutton Lane, Poltairs Bay, Herts. EN6 2PD.

EASTERN GAS

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Growth of 100% per annum demonstrates the forward looking attitude of this major U.S. mini manufacturing service worldwide, offering excellent opportunities in London/County to ambitious service engineers. Comprehensive product training on an intensive range of high performance systems will be provided. Suitable young engineers seeking an opportunity to be one of the world's most respected manufacturers.

SERVICE ENGINEERS £7,500 + CAR + OT + 40% BONUS

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NEW COMPANY TO £9,000 + CAR + OT + 40% BONUS

New company has introduced unique mini based system and is seeking three support/service engineers to establish service facility from scratch. These positions offer involvement and will appeal to enthusiastic engineers able to demonstrate initiative and computer experience. Call KEITH WALLIS for details on any of the above many others at 01-843 1540 or 08-546 1885.

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01-843 1540 (ext. 1)

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New Project and Financial Control Systems

Surrey c. £12,000

Our client, a highly successful and reputable international company, is demonstrating its commitment to further success in the eighties and beyond by its advanced computerisation of project and financial control systems.

The Candidate

You will have had considerable experience in the design and development of computer systems. Your background may be in mainframe or minicomputers. You should have an awareness of financial, business and management information systems and an up-to-date knowledge of hardware and application packages. You will be an innovator with good personal communications skills.

The Position

Working with the financial director initially, you will analyse current manual and computerised systems. After consultation with other senior management, you will be responsible for designing total systems for the future, specifying the necessary hardware, preparing the implementation plans and managing their development.

This is a key role in the company. The successful candidate can look forward to a very attractive future. Contributory pension scheme, free or reduced BUPA, relocation assistance where necessary.

Apply in confidence to Terry Harvey by sending personal and career details, or contact him for an application form, evenings 61. Missenden (02406) 4705 or daytime as below.



Harvey Recruitment
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500 Chesham House, 150 Regent Street,
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SENIOR ANALYST/PROGRAMMER NHS

Admin. & Clerical Grade 9

Current Salary range £7,861 to £9,288 Inc. London Weighting. Applications are invited for this post in a small team developing the integrated Hospital Computer System, based at Northwick Park Hospital. The successful applicant will act as Deputy Project Manager, will be responsible for advising the Project Manager on Software aspects of the existing development as well as contributing to the design of further modules. The work, which carries a high degree of responsibility, demands enthusiasm and technical competence. Preference will be given to applicants with previous experience in Hospital computing and familiarity with CORAL 66 Programming will be an advantage.

Application form and job description from Mr R. Stevens, Staffing Officer on 01-844 5311 Ext. 2001.

Closing date 18th February 1981 (4278)

THE UNIVERSITY OF HULL

Administrative Data Processing Unit

Applications are invited for the post of

PROGRAMMER

from persons with at least two years' programming experience, preferably using COBOL in an ICL 2903/4 environment. Experience in on-line programming techniques would be an added advantage.

The post is available for a period of 2 years.

Salary scale: Range 18 for Administrative staff - £5785-£6085 (under review) plus USS benefits.

Applications (8 copies) giving details of age, qualifications and experience, together with the names of two referees should be sent by February 13, 1981, to the Personnel Officer, University of Hull, Hull HU6 7TS. Interviewees further particulars may be obtained.

(4284)



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Current vacancies include:

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London, all areas of Home Counties, Berkshire, Midlands, South East, Wales, Hertfordshire.
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- * **Peripherals**
London, all areas Home Counties, Berkshire, Hertfordshire, S. Wales (IBM orientated), Midlands.
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Home Counties, London, S. Wales.

We need to know your background and requirements in order to help you - so register with us now.

Contact: Andy Wright or Mike Creamer

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There's nothing in the world like the real-time data processing system that's the heart of the Airborne Early Warning Nimrod.

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If you're becoming increasingly frustrated with designing and implementing systems that all seem to have much the same applications, come and work on the AEW Nimrod software and its associated proving facilities.

You'll be more familiar with the work than you might imagine - especially if you have a sound background in real-time systems and analysis. But the one thing you won't be familiar with is the interest and satisfaction of becoming totally involved in a major system with a totally new application.

And on that score, few jobs can compete with this.

Mission Software Team Leader.

The team that you will lead will produce mission software to enable air

crew in the AEW Nimrod to interrogate the central AEW database and central aircraft subsystems. You will understand the customer's operational and technical requirements and will liaise with hardware and design teams. You have had leadership experience and a knowledge of CORAL 66 and real-time systems.

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You will implement mission software in a team which will provide operator facilities to air crew operating the AEW Nimrod. The software will run in the central computer and interface with both microprocessor based operator consoles and also complex electronic subsystems. You have at least 18 months' relevant experience with high level languages, preferably CORAL 66.

These are positions open only to men and women who have the relevant experience. Posts are also available in other sections for those with equivalent experience and for those employed in related fields who wish to broaden their experience.

Write giving brief details of your experience to C. Hill, Marconi Avionics Limited, Elstree Way, Borehamwood, Herts. Telephone 01-953 2030, extension 3443. Alternatively, telephone 01-207 3455 anytime. Please quote reference MA80/23.



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Central London

Days only

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The London based DP Headquarters of an international group of companies is seeking an experienced IBM Operator to assume responsibility for an IBM System 34 on a days only basis within the hours of 6.00 am to 7.00 pm.

This is a unique opportunity to:-

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- learn RPG11
- work days only

The successful applicant will:-

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Reporting directly to the DPM, this position offers a great deal of personal autonomy to the right individual, and full training facilities are available to supplement existing IBM experience with any System 34 knowledge which may be required.

If you would like to hear more about this unique opportunity, contact Phil Gascoigne on 01-935 0671 (24 hour answering service), or Epsom (78) 29166 evenings and weekends (7.30-9.30 pm).

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Birmingham 021-236 3781 35-37 Great Charles Street, Queensway, Birmingham B3 3JY
Manchester 061-933 0427 Blackfriars House, The Parsonage, Manchester M3 2JA
Brussels 010 322-840 7151/71 Avenue Louise 327, Boite 4, 1050 Bruxelles

SEN

(428)

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Senior Planning Specialists to £11,780

A minimum of 5 years experience in an EDP/Business systems environment working as a Project Manager on complex multi-projects is required. You will participate in the initiation and preparation of long and intermediate term Ministry Plans for the effective use of professional staff and EDP equipment. You will also be responsible for the effective monitoring of systems to ensure adherence to the plans.

Computer Systems Analysts to £9,860

You will act as a senior member of various project teams participating in the identification and analysis of the computer systems needs and following through with the implementation of the designs and solutions developed. A minimum of 5 years experience is required as is working knowledge of ANS COBOL and JCL, preferably IBM; exposure to IMS data base technology and online systems applications would be a decided asset.

Computer Systems Managers to £11,780

A minimum of 5 years experience in complex business applications and project management is required. Specifically, you will be managing and/or co-ordinating a team of systems professionals who provide computer systems development, maintenance and production support to various branches of the Ministry. Exposure to IMS Data Base technology and online systems applications would be a decided asset.

Business Systems Analysts to £9,860

You will act as a senior member of various project teams participating in the identification and analysis of the Ministry's organization and methods needs and following through with the implementation of the designs and solutions developed. A minimum of 5 years experience in a complex multi-project environment, preferably financial in nature, is required for these positions.

Data Base Specialist to £11,780

You will provide technical support for the design, development, security and maintenance of current and future data base systems, as well as monitoring the data base operations and implementing improvements to enhance their performance. A minimum of five years in EDP at the technical level is required as well as a thorough knowledge of IBM computer hardware and the "internals" of IMS data base software and its interface with an OS MVS operating system.

Analyst/Programmers to £8,512

You will be involved in the translation of client needs into programming specifications and required to participate in the development and support of the Ministry's computer systems. Thorough knowledge of ANS COBOL and JCL (preferably IBM) is required as is a minimum of 3 years experience in complex business applications utilizing large mainframe computers; exposure to IMS data base technology and online systems applications would be a decided asset.

These are permanent, full-time positions. In addition to the excellent starting salaries, the Ministry provides an extensive package of fringe benefits including major Medical, Health, Dental and Insurance plans. Attractive relocation allowances will be provided to successful applicants. These positions will be based at the Ministry's new Head Office in the city of Oshawa, a 45 minute drive from central Toronto.

*Salaries based on exchange rate as of January 16th, 1981.

Senior Ministry officials will be interviewing selected applicants in the United Kingdom commencing in March, 1981. If you meet the minimum requirements for the position you are applying for, and are interested in a career with a fresh new horizon, please submit a detailed resume including position(s) applied for, qualifications, experience and personal data to: Government of Ontario, c/o Dept. 99, Selective Placement Service, Ontario House, 13 Charles II Street, London SW1Y 4QS.

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Here is the chance to work in a banking installation and take advantage of the generous benefits. You will need to have 1 1/2 years' plus IBM OS/VS1, CICS or 3000 VM experience. There is a two-shift system worked over a five-day week. Perks include mortgage assist., non CPS, bonus scheme and four weeks' hols.

CW/3 SIMON

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A Banking Installation in central London requires a Senior Programmer with 2 years' + solid IBM COBOL experience. Work involves both development and maintenance. DOS/CICS is an advantage, leadership qualities are essential for this position. There are excellent prospects. The applicant should be within commutable distance of central London. Excellent Banking benefits include ass. mortgage, subs. meals, assisted BUPA, CPS and 4 weeks' hols.

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CITY To £10,000
An excellent opportunity to work for a well-known American bank in the City. Requirements for this position are 2 years' + analysts and design experience in Banking & Financial systems, 2 years' + programming experience and IBM CP or Database systems is an advantage. Company benefits are first rate, including bonus scheme, house and personal loans, 5% loan, free lunch, life assurance, etc.

CWS/2 TRICIA

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Recruitment Consultants
Universal Computer Associates Limited
Data Express House
Prospect Place, London W8 3BH
01-995 8138 Evenings

UNIVERSITY OF KENT AT CANTERBURY COMPUTING LABORATORY PROGRAMMER

Applications are invited for the post of Programmer in the Computing Laboratory, initially to work on administrative data processing applications for the University Registry (Financial System, Student and Staff Records, etc.). Salary within the range £2,000 to £2,500 per annum.

Application forms and further particulars of the post will be sent upon receipt of a completed and addressed envelope (10" x 5 1/2") to Mr. Alan Guster, The Registry, The University, Canterbury, Kent CT2 7WZ. Please quote reference A3/81/CV on the envelope. The closing date for the receipt of completed application forms is Friday, 20th February, 1981.

(423)

THE UNIVERSITY OF SHEFFIELD MRC/SSRC Social and Applied Psychology Unit

RESEARCH OFFICER

Applications are invited from graduates in psychology or computer science to join a research group undertaking experimental studies of human factors in computer programming and software engineering. Tenable for three years from a date to be arranged. Initial salary on Range 1B or 1A from £5150 to £6845 a year. Some postgraduate experience is desirable, but not necessary in this field, although programming experience is essential. The Unit is currently seeking possession of an advanced qualification running under the MRC/SSRC Department of Psychology, The University of Sheffield, S10 2TN, Quoted ref. 5635/PB.

BOX Nos.

Box number replies should be addressed to:
Box No. 1
c/o Computer Weekly
Select House
Sharncliffe Road
Sheffield S1 4BA

Targa

CITY ANALYST (BANKING) £11,000

The London Branch of a major European bank is about to commence development of its banking systems and requires a SYSTEMS ANALYST to complement the existing team. The ideal applicant will have at least one year's experience as an Analyst and should have been involved in a project from feasibility to implementation. It is also essential that experience of FOREIGN EXCHANGE and REAL TIME systems forms part of the background. Excellent banking fringe benefits apply. Ref: R.3177.

CITY RECRUITMENT CONSULTANT £10,000

Targa Computer Services which was established in 1978 is part of a group of companies serving the computer industry. We seek a CONSULTANT to expand activities within the more SENIOR range of applicants. Ideal candidates will be over 26 with experience of SYSTEMS ANALYSIS or PROGRAMMING and have the ability to assess people and communicate effectively at all levels, advising clients of salary levels, advertising and job specification. Generous basic salary, incentives and benefits are offered. Ref: R.3187.

CHIEF PROGRAMMER £11,000

A leading company in the leisure industry seeks a Chief Programmer to lead an existing team. Ideal candidates will be familiar with structured programming techniques and have the management skills to recruit, train and develop staff, together with the ability to assist at the systems design stage. A COBOL background is essential and exposure to recent IBM hardware together with CICS a definite advantage. Benefits include relocation, bonus and flexitime. Ref: R.3184.

CITY COBOL PROGRAMMERS £7,000

A leading City-based International Company seeks COBOL programmers with upwards of two years' experience. Very bright young people with UNIVAC or IBM experience, together with an exposure to on-line programme development. This is a development opportunity in an expanding company offering excellent fringe benefits. Ref: R.3182.

CITY PROGRAMMERS (BANKING) £7,000

We require programmers and SENIOR programmers for leading city-based European banks. AIMS experience is essential and demonstrable supervisory or management abilities will be required by the senior people. The usual fringe benefits will apply. Ref: R.3178/8.

ANALYST/PROGRAMMERS £7,000

Several analyst programmers are required to work in a recently installed UNIVAC 1100/81 installation. A COBOL background together with expertise in FILE TAB, UNITED and applications work on FINANCIAL or MANUFACTURING systems is required. There is also a requirement for an ANALYST with considerable DATABASE experience. Ref: R.3174/3.

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up to £13,700 p.a.

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up to £13,600 p.a.

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up to £11,700 p.a.

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up to £11,600 p.a.

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Our client is a major service organisation, located in CROYDON, close to all transport (in case you like travelling). They are looking for a conscientious analyst to assist in the development and implementation of a variety of in-house and service bureau systems.

In addition to DP skills, the Analyst must have the ability to control operating staff on the in-house 6700/PDP-11.

Salary will be around £8,000.

For further information, please telephone (24 hour answer service) or write to Joan Ainsworth quoting ref: CW103/1A.

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This position carries attractive Company benefits including a non-contributory pension scheme, free life assurance and free BUPA.

For further details or an application form ring SUE HAMPSON on Wellesbourne 782711 or write to MODCOMP, Molly Millars Lane, Wellesbourne, Berks.

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OPERATORS

- ICL 1900 SENIOR OPERATOR LONDON c. £7,100**
Computer centre situated in South West London require an experienced operator for the above position. At least two years' experience of GIL is needed for this two-shift only post. J.4913
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Operator required for large installation situated on North West London/Middlesex borders. A year's experience on large ICL main frames using GIL or VME/B is necessary for this interesting position. Excellent company benefits. J.4906
- ICL 1900/2900 OPERATOR SURREY c. £6,200**
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- ICL 2900 OPERATOR SURREY c. £6,000**
Large company in the food industry requires an operator for their recently installed 2950 using DME. GIL experience is desirable. Situated on South London/Surrey borders this position is two-shift only with free meals provided. J.4921
- ICL 1900/2900 OPERATOR LONDON c. £5,700**
Well-known retail company in West London requires an operator with at least two years' experience of GIL and VME/B for their 1904/2970 installation. Good company discounts and benefits. J.4893
- ICL 2900 OPERATORS LONDON c. £5,600**
Two operators with GIL/DME experience are urgently needed by a retail company in West London, using a 2950. Useful company discounts. J.4917
- IBM 4331 SNR OPERATOR LONDON c. £7,000**
This Computer Centre in South West London require a very experienced operator. At least 5 years' experience of DOS/VS is needed for this day only post. G.4920
- IBM 370 OPERATOR BEDS/BUCKS c. £6,500**
Large Insurance Co. relocating late '81 requires operators with at least 12 months' experience of DOS/VS Power and CICS. Excellent company benefits. G.4971
- IBM 3031 SHIFT LDR. LONDON c. £9,000**
Large company in central London require experienced shift leader, good OS, JCL, a must, also MVS JES3 or good JES2. At least 5 years' experience required. Good company benefits and prospects. G.4983
- IBM 3031 OPERATOR LONDON c. £7,000**
Large company in central London require an experienced operator, good JES2 and OS/JCL required. At least 3 years' experience required. Good company benefits and prospects. G.4983
- IBM 4331 OPERATOR SURREY/SUSSEX c. £8,250**
Well-known company in Surrey require an operator with 18 months' experience under DOS/VS using POWER/VS. Good company with pleasant surroundings for this 2-shift position. G.4973
- IBM 4331 SHIFT LDR. LONDON c. £6,250**
Large Insurance company require a Shift Leader with 18 months' experience using DOS/VS with VTAM and CICS. Very good company benefits for this shift position. G.4988

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TRAINEE SYSTEMS PROGRAMMER

Circa £5,000

Gateway Building Society - one of the larger Societies in the country - require a Trainee Systems Programmer for work at their Head Office in Worthing on the Sussex coast.

The Job:
To assist in the installation and maintenance of system software.

The Person:
The applicant should have at least 18 months' experience of using IBM hardware and software or should have suitable academic qualifications in computing.

The Installation:
The Society operates an extensive teleprocessing network based on an IBM 370/148 at Worthing. Software in use includes VM, DOS, CICS & DL/I.

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 - ★ Free Life Insurance cover
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 - ★ Good recreational facilities including swimming, pool, squash and tennis.

Applications giving details of relevant experience and qualifications should be sent to:
Personnel Officer, Gateway Building Society
P.O. Box 18, Worthing
West Sussex BN13 2GD



DESIGN AND CONSULTANCY ANALYST/DESIGNER SOFTWARE

£10K+

This successful systems house, well known for 14 years, handles major design and consultancy projects covering mainframe, mini, micro and TP applications. If you have a background in commercial or industrial DP systems, DON'T want to be a DPM too early and live Middlesbrough, then ring today for full details of the career and personal benefits. Ref: CA 225

£10K++

IMAGINE: Choice of application, range of mini/micro hardware £1k. car allowance, relocation, salary to £11k. wide range of technical language and usual company benefits. If you have technical software experience, live Middlesbrough/Sunderland, then ring now! Ref: ER 376

AB EXECUTIVE / (KINGSTON) LTD.
01-549 6441 24 hour service

Manager - Engineer - Programmers

Mini Computer Systems

E. Berks £6,000 to £10,000 + car
A friendly, successful, genuine systems house requires additional staff because of expansion.

Project Manager

Responsible for major accounts from order to installation. Must be capable of liaison with all parties in between. £10,000 + car. (Higher salary for exceptional candidate.)

Engineer

Designer, with software experience. Intelligent interfaces, micros and mini-systems.

Programmers

Bright, capable programmers. Systems software experience, specialist applications. Prefer BCPL or similar. Also FORTRAN specialists.

M6800 Programmer

Data Comms. Manufacturer

W. Bucks. c. £9,000 + car

Our client, a small, private U.K. Company, requires an experienced programmer to assist with client special applications in connecting W.P. Systems to international telex networks. Knowledge of data comms. and binary protocols an advantage.

DEC Programmers

Systems S/W and Commercial Applications

Hants. £5,000 to £9,000 + car

Our client requires a number of programmers with 1 to 3 years experience. PASCAL, Macro-11 and RT-11, RSX-11 and BASIC useful. Turnkey business systems require COBOL, or micro-COBOL. The more senior position requires applications experience: payroll, ledgers, order processing, etc., this is a support role with a car or car allowance. A junior applications position requires 6 months, or more COBOL.

Technical Support Specialists

Sophisticated Minicomputer Systems

W. London to £12,000 + car

Our client requires additional experienced support staff to meet the needs of a growing customer base. You will need several years software experience to include: real-time, data comms. and/or database systems. Analysts with banking or financial systems experience would be of particular interest.

Apply in confidence to Terry Harvey by sending personal and career details, or contact him for an application form, evenings Gt. Missenden (02946) 4705 or daytime as below.

HR Harvey Recruitment
Executive and Computing Personnel Consultants
300 Chiswick House, 150 Regent Street,
London W9 5LA Tel: 01-734 5351

Systems and Programming Consultants

London/Home Counties £8k - £11k

A multinational organisation which is expanding in the U.K. and Europe needs to complete a team for work on a variety of applications in both mainframe and distributed processing. The successful candidates will have at least 2 years' COBOL or PL/I experience and will be aiming to improve their technical skills as well as to exercise their proven ability to liaise constructively with users. Experience of Database applications would be an advantage.

Opportunities exist at the main London site and in the surrounding area. For further information, contact Julian Harrison quoting reference 4174.



Lloyd Chapman Associates

125, New Bond Street, London W1Y 0JH 01-406 1670

BOX Nos.

Box Number (please send to)
a/c Computer Weekly
125 New Bond Street
London W1Y 0JH

Do you enjoy responsibility?

Can you program?
Are you enthusiastic?

We need you

For a full time position in a leading computer consultancy, we are looking for a motivated and enthusiastic person to join our team.

We're looking for rare birds.



CICS or ACF/VTAM Systems Programmers Birmingham to £9.5K + Bonus

There are superb opportunities for good IBM Systems Programmers with one or more years experience of supporting either CICS or ACF/VTAM, at this large and expanding mainframe and mini site. Career prospects are increasing as our Client advances ever further into sophisticated Data Processing and Manufacturing Control Techniques, involving latest advancements in hardware and software technology.

Generous financial and personal assistance will be given to you to help you relocate comfortably and you can look forward to large company benefits and a successful career with this market leader in a very stable industry.

In the first instance, telephone me, Digby Dyke by transfer charge on 021-643 8501 between 9am and 6pm or on 06845 2210 evenings between 8pm and 11pm or anytime weekends, and I will be glad to discuss these opportunities with you.

Computer People Midlands

Alpha Tower
Birmingham B11 1T
Telephone: 021 613 8501
& Bristol 0272 292966

Recruiting for clients



ANALYSIS opportunity for Assembler Programmer

S.W. London c. £8,500 + Benefits

Our client is one of Britain's major blue-chip groups whose diversity of interests ensures their continuing success and provides a secure environment in which you can develop your career.

Their diversity demands extensive use of advanced data processing facilities which currently includes an IBM 4341 operating under DOS/VSE and numerous mini-computers.

They have an extensive development plan with an emphasis on on-line systems using CICS.

The successful candidate will enjoy a high level of user contact and be responsible for the analysis, development and implementation of a wide range of applications. As a result, he/she will gain exposure to teleprocessing and database software.

Ideally, you should have:

- a sound knowledge of IBM Assembler or equivalent language in a commercial environment
- the desire to accept a high level of responsibility and progress rapidly in a full analysis role

In addition to a negotiable salary, the company offers an attractive range of benefits.

For more details telephone or write to: Andrew Chapman, Lloyd Chapman Associates, 125 New Bond Street, London W1M 4DF. 01-406 1670

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125 New Bond Street, London W1M 4DF. 01-406 1670

SYSTEMS SUPPORT ENGINEERS IBM-COMPATIBLE CPU's c.£9½K PLUS CAR

We are a large multi-national group of Companies with diverse interests throughout the world. We have recently commenced marketing IBM-Compatible CPU's in the UK. Our range consists of both medium and very large mainframes, the largest of our products being more powerful than the new IBM 8081.

In order to establish this operation, we are seeking a number of Systems Support Engineers to provide pre and post sales support to our Clients in the areas of Operating Systems and Systems Software packages.

We are seeking experienced Systems Programmers or Systems Engineers with current involvement in any of the following areas:

DOS/VS, DOS/VSE, VS/1, MVS, VM

Our initial requirement is for a Systems Support Engineer with DOS/VS - DOS/VSE experience to be based in the South Midlands area with easy access to the M1 motorway. We are also seeking applicants with experience of VS/1, MVS and VM to take up similar positions in various other locations throughout the Country.

This is a very exciting and challenging period in our Company's development. In addition to providing Systems Specialists with outstanding career development prospects, BUPA and a range of very attractive Big Company benefits.

If you are seeking a chance to use your personality as well as your technical skills, contact our Advertising Consultant IAN PAYNE on 021-236 3781 (24 hours answering service) or 0827 282430 (evenings and weekends) to obtain further details.



Specialist Computer Recruitment Ltd

London 01-836 0871, 3 Mendeley Place, Wigmore Street, London W1M 6LB
Birmingham 021-236 3781, 35-37, Great Charles Street, Queenway, Birmingham B3 3JY
Manchester 061-833 0427, Blackfriars House, The Personage, Manchester M3 2JA
Bristol 011-222 6400, 216/171 Avenue, Lough 327, Suite 4, 1050 Bruckley

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Machines

We have been retained by Saudi Business Machines, a wholly-owned company of the Juffali group and general agent for IBM World Trade Corporation in the Kingdom of Saudi Arabia.

Due to the rapidly expanding market opportunities Saudi Business Machines is pursuing a long-term staffing plan and are looking to recruit:

SYSTEMS ENGINEERS
up to £22,000 tax free

CUSTOMER ENGINEERS
up to £17,000 tax free plus overtime opportunities and many benefits

Substantial experience of IBM hardware and/or software is essential.

In addition to attractive tax-free salaries, Saudi Business Machines, as a leading employer, offers excellent conditions which include: ● Married or single status ● Free accommodation ● Furniture loans ● Car allowance ● Free medical covers ● Indefinite term employment with career prospects ● Holiday flights to home country.

Positions are open to all nationalities, client interviews will be arranged towards the end of March.

As a first step you should contact Mike Mead immediately on 01-242 9356 or write to him at OCC Computer Personnel, 16 Bedford Row, London, WC1R 4EB, quoting reference 950/CW.



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Specialists since 1971 in UK and international computer and technical appointments.
Please contact us for assistance and guidance with your next change.

ANALYST/PROGRAMMERS

£8,500-£11,500 p.a. RELOCATION PACKAGE AVAILABLE TO SWINDON

This major corporation is setting up a brand new European Data Centre based on an IBM 4331 network using CICS, TSO, VSA. The department's offices and computer room are literally being built at this moment. The development plan has been agreed and we now wish to recruit three rather special analyst/programmers; people with the resilience and personality to attain a high level of achievement and professionalism in their work, despite any teething problems that may occur.

The d.p. department reflects the company's dynamic, modern approach to management, giving members an opportunity to express their thoughts and accept responsibilities commensurate with their abilities. The company manufactures very high technology products and its growth over the last decade has been one of the talking points of Wall Street. Now it is a multi-million dollar corporation whose profits enable it to pay top industry salaries. Corporate personnel policies have developed a company where the average age is lower, and the average intelligence is higher than normal. The management is results oriented and the company is driving forward from success to success.

These posts represent a real opportunity to gain excellent experience in a modern IBM on-line and database installation. The department is still in its embryonic stage, consequently those capable of making a substantial practical contribution now, can in future, enjoy considerably increased salaries and responsibilities. Projects will be technically stimulating giving true job satisfaction.

QUALIFICATIONS. The only mandatory requirements are a minimum of 4 years' IBM COBOL programming and some exposure to analysis. Naturally if you have CICS, TSO and VSAM all the better. However to be successful you must have the personality that ignores job demarcation and instinctively tackles any task necessary to achieve the end result. Intelligence and good communications ability are taken as read. A good relocation package is available.

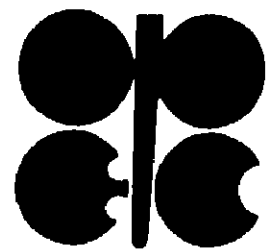
To join a first-class department, obtain an increase in salary and enjoy the quality of life associated with living in the West Country.

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REF. 3/1

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10 Wilfred Street, London SW1E 6PL. Telephone: 01-828-7956



Organisation of the Petroleum Exporting Countries

offers experienced Data Processing professionals most challenging job opportunities in its Computer Section. Applicants are invited from candidates with basic academic qualifications up to a Technical or University Degree or equivalent professional training plus a minimum of 5 years' working experience in the computer applications field and in FORTRAN, PL-1 or Mark IV programming. Fluent English is essential.

DATA BANK ADMINISTRATOR

Profound knowledge in File Management Systems and DPMS packages is necessary. Experience in the design, implementation and operation of data banks, in the enhancement of performance and in establishing standards for operational procedures and documentation is required. The successful candidates should have implemented at least a medium-size database application using one of the major DPMS in a multi-user environment.

SYSTEMS PROGRAMMER

Deep knowledge of IBM operating systems (MVS/TSO, VM/OMS) and their associated hardware components. Must be familiar with installation and maintenance of software packages and a detailed knowledge of IBM assembler language, JCL and usage of interactive monitors. Knowledge of CICS and STAIRS would be an asset. Some knowledge of Digital PDP series minicomputers also welcome.

APPLICATION PROGRAMMER

Specific working experience in the development of D.P. applications is required; thorough practice in FORTRAN is necessary, as well as basic knowledge in operating systems, DPMS and file management systems. Educational background in methods of Operations Research and experience in large-scale modelling is welcome.

DATA BANK ANALYST

Good background and experience in developing, running and maintaining commercial information systems that handle large volumes of data. Knowledge of Mark IV very desirable. Basic knowledge of at least one major DBMS is required.

The posts are permanent and provide for tax-free salary and social benefits. Applicants are requested to send their detailed curriculum vitae including job history and salary progression as well as a recent photograph to:

O P E C
Personnel and Administration Department
Obere Donaustrasse 93, 1020 Vienna, Austria

Telecomputing

ONLINE DEVELOPMENT STAFF

SYSTEMS ANALYST/ PROJECT LEADER

- Experienced Systems Analyst with ICL COBOL programming background. Must have successfully implemented at least one major on-line system.
- Located in the West End of London, the job is with one of our clients, a major listed Property and Investment Company.
- An outstanding opportunity to be involved from the early stages in the introduction of on-line systems using TPS on a newly-installed ICL ME29. The successful applicant will be required to communicate effectively with all levels of user management and will need the technical ability to carry a complex on-line system through to implementation.
- The salary is unlikely to be a limiting factor for the right person. Our client is able to offer pleasant working conditions and a comprehensive benefits package.

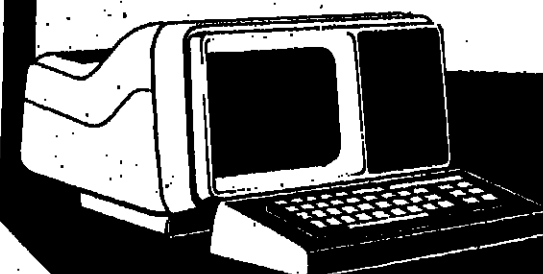
COBOL PROGRAMMER

- A minimum of 18 months' experience on ICL hardware.
- Based in Oxford or London, but may involve working at client site throughout the UK and occasionally abroad.
- Challenging work on new on-line developments.
- As a well-established software house we are able to offer an attractive remuneration package and excellent opportunities for rapid career development.

For further information please contact:

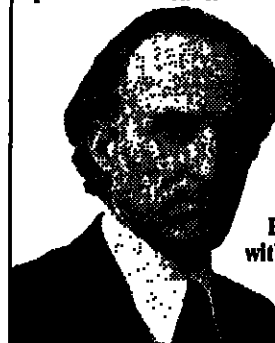
Terry Kirk
Telecomputing Systems Ltd.
Seacourt Tower
West Way
Oxford, OX2 0ED
Tel: 0865 723621

Lance Dorman
Telecomputing Systems Ltd.
Seacourt Tower
73 High Holborn
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"IDEC has a lot to offer the experienced Software Professional"

"I made the right move when I joined IDEC. It has given me the opportunity to become involved in big projects and to lead a professional team."



The work is very stimulating and challenging. And it's refreshing to work with co-operative people who will listen to and value your opinions and ideas. Computers and telecommunications make a very powerful combination, and it is an area in which IDEC is already a world leader. Our new project will take us much further. In fact I'm looking forward to the future with IDEC."

DANIEL ERZEN - Systems Consultant

As a development centre for ITT in Europe, IDEC is an established innovator in advanced micro-processor based communications systems and associated software.

Over the next few years, there are going to be some very exciting things happening at IDEC. And that's why we're now looking to strengthen our Software Development operation by appointing a number of Software Professionals into rewarding positions within our successful, fast-moving organisation.

With IDEC, you'll become an important member of a talented team working on challenging projects which involve highly sophisticated and advanced micro-processor engineering, firmware, software and systems. You'll also enjoy the opportunity of total project involvement — the chance to stay with

your project right through from inception to completion.

In terms of rewards, you'll find IDEC hard to beat. Our salaries, conditions, training facilities and benefits are amongst the best in the business. And in our successful, fast expanding organisation, opportunities exist for rapid promotion.

So if you're an experienced Software Professional male or female looking for greater rewards, a progressive career and fresh challenge, join Doug, Chris, Daniel and the rest of the development group at IDEC.

And start succeeding in your career. Contact Sue Downes or Chris Turner at the address below to arrange an immediate interview. IDEC - ITT, Orchard House, Mutton Lane, Potters Bar, Herts. Tel: Potters Bar (0707) 51199.

"I joined IDEC 18 months ago as Principal Programmer. Now I'm a Team Leader — running the team I first joined. Individuals really matter with IDEC. You're an important member of a team where everybody makes a contribution. And it's very rewarding to work for a successful organisation, producing a successful product."

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CHRIS HILLS - Team Leader

DOUG BRODIE - Software Development Group Leader

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That's why IDEC has a lot to offer the experienced software professional. You'll get experience of advanced real time software for micro-processors developed on IBM/Amdahl mainframes. And the new projects that are on the way are bigger, more exciting and more challenging.

IDEC is a young, informal Company where progress is based on performance. And we like to reward our people very well. In fact, looking around, there aren't many companies to beat us."

ITT-IDEC



RESEARCH ASSOCIATE

POLYTECHNIC OF THE SOUTH BANK
MICROCOMPUTING ADVISORY CENTRE

Business and/or Computing Graduates are required to work on a project concerned with the USE OF MICRO-COMPUTERS AS AN AID TO MANAGEMENT. The project is sponsored jointly by the polytechnic of the South Bank and a well-known employers' association and will last for six months. Candidates will be expected to work closely with participants and have some experience of Business and Computing Applications.

Salary £5,708-£6,248 p.a. + London allowance £768.

Application forms from The Staffing Office, POLYTECHNIC OF THE SOUTH BANK, BOROUGH ROAD, LONDON, SE1 0AA (Telephone 01-828 8889) ext. 2023, to be returned by the 13th February, 1981.

university college of swansea

Microprocessor
Centre Manager

Applications are invited for the post of Manager for the College's established Microprocessor Centre, which provides a service to the college and to industry. Applicants, male or female, should have a degree or equivalent qualification, together with appropriate experience with microprocessors. The post, which includes responsibility for the day-to-day running of the centre, liaison with users and the continuing development of the service, would be suitable for a person with demonstrable technical competence who is seeking to apply managerial skills. The salary will be on the scale £9,220-£11,578 per annum.

Communications
Engineer

Applications are invited for the post of Communications Engineer in the Computer Centre. The successful applicant will join a team developing a terminal switching network in the college, and will be expected to make a major contribution to the computer-to-computer communications both within the college and between the college and other universities.

Applicants, who should be graduates, or have equivalent qualifications, should have experience of hardware maintenance or design of computers and/or communications equipment. A knowledge of software and communications systems would be an advantage. The appointment, which will be for a fixed term, will be on the scale £5,606-£7,585 per annum plus USB/USDF benefits.

Further particulars for the above posts and application forms (2 copies) may be obtained from the Personnel Office, University of Swansea, Singleton Park, Swansea, SA2 8PP, to which office they should be returned. By Friday, February 20, 1981.

ASSISTANT TO DP/WP CO-ORDINATOR

An expanding Lloyds Insurance Broker is seeking a person of 24/25 years of age to act as an assistant to their DP/WP Co-ordinator.

The applicant must have some IBM system 3/34 operational and programming experience. Also preferably some insurance knowledge.

Salary negotiable circa £7,000.
Suitable applicant please contact:
Mrs. S. Palmer on 01-481 3904

SAUDI ARABIA

We are seeking the following staff for backhaul status contracts:

Analyst/Programmers
With approximately 3 years experience of IBM computers, COBOL and JCL. Also be able to design programs, program maintenance and develop systems feasibility studies. (Ref: 902)

Operation Restart and Recovery Specialist

3 years experience in the field of on-site production job failures and the operation of a master terminal for online telecommunications facility. (Ref: 3E)
For application form ring Gordon Newton on 01-222 8777, or write to Lansdowne (Middle East) Ltd., 2nd Floor, 100, 36 Great Smith Street, Westminster, London SW1P 3BU.

Computer Supervisor

THE COMPANY

Aberdeen Service Company (North Sea) Limited is one of the major general service companies involved in the North Sea Oil industry. Its operations encompass the purpose-built South Bay Marine Base at Peterhead; Engineering facilities at Peterhead; the provision of specialist personnel for Offshore Platform Maintenance; Transport; Property; and the supply of Bonded Goods to the Offshore Industry.

THE JOB

Due to continued expansion of our data processing activities, a vacancy has arisen for a suitably qualified computer professional, reporting to the Computer Manager. The successful applicant will be responsible for controlling the day-to-day operation and supervising the computer staff. Other duties will include scheduling work; liaison with user departments; fault diagnosis and maintenance of application software; and providing holiday and sick leave cover.

APPLICANTS

Applicants must have a good general education with at least two years' relevant computer programming experience.

BENEFITS

Salary and benefits will be commensurate with qualifications and experience. There is a contributory pension scheme and free life insurance. Applications should be made, in writing, to:

Mr. W. N. Guy,
Senior Financial Manager,
Aberdeen Service Company
(North Sea) Ltd.,
Guild House, 28 Guild Street,
Aberdeen AB1 2NJ.

ASCO

Onshore Services for Offshore Oil

PART-TIME

COMPUTER PROGRAMMER

Person required 3 1/2 hours per day with at least 3 years experience of Programming preferably on I.B.M. Computer, language RPG/II. Successful applicant would be writing programmes as a supplement to our full-time programmer. Please telephone for further details.

Personnel Manager
DEWHURST & PARTNER LTD.
Inverness Road, Hounslow, Middx. - 670-7781

Senior Analyst

Salary: £8,474 - £9,883 p.a.

The Authority is looking for an experienced Senior Analyst who has a relevant qualification of degree standard and preferably at least 3 years' experience in computer systems analysis.

Applications will also be considered from suitable people with less experience for appointments at the lower end of the pay range.

You will be helping to design systems to enable the Authority to carry out its functions covering the whole water supply. You will be housed in a new purpose-built computer centre situated at the Authority's head office near Warrington, with a daily I.C.T. 24/7 computer supporting an extensive communications network to divisional offices.

There is an ever-growing demand for computer systems and the development of this network and associated facilities, using a variety of terminals, is under constant review.

Closing date for applications: 31st February 1981.
The above posts are open to men and women.

Application forms available from the Personnel and Management Services.

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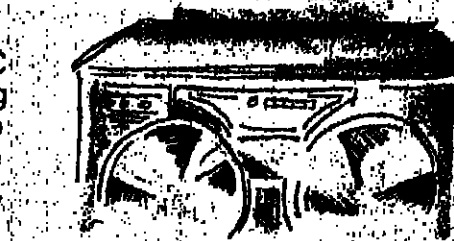
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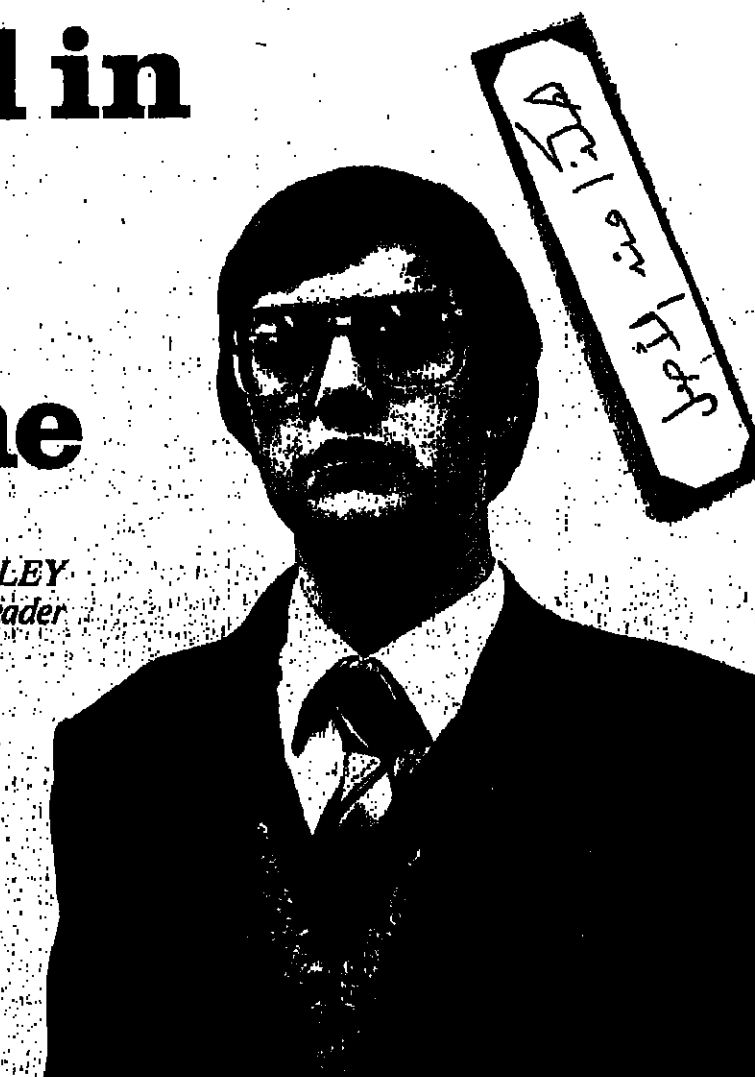
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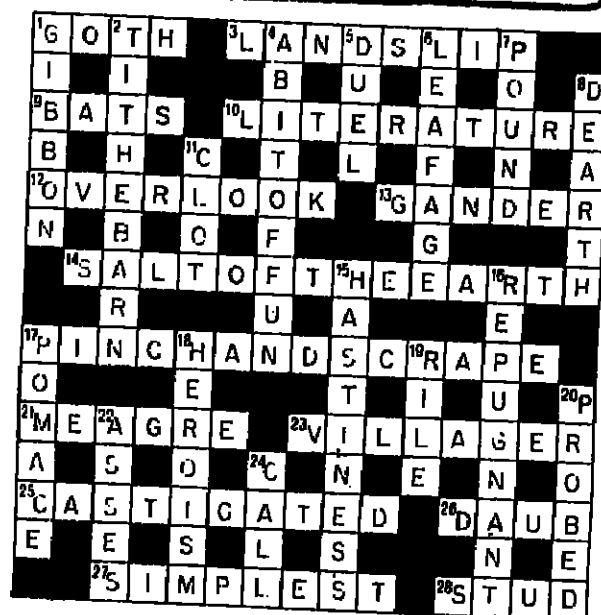
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CW Prize Crossword 12



FIRST prizewinner for January's Crossword is John Pead who is a partner in software specialists Murray, Pead of Beckenham. He wins £10. Winners of £5 are Mark Booth, a systems programmer with British Telecom's Leeds computer centre, and John Wright, systems consultant with Leicester Computer Bureau.

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THE SALES BIT

Getting back to basics — why do people buy?

IN recent weeks, several of my sales recruitment clients have asked when this column will get back to basic principles. When is there to be a return to a regular flow of commentary on selling practice for them to cut out and distribute to their salesmen? (Accompanied where appropriate by the own remarks, criticisms and demands).

Remarkably, such questions have also been accompanied by the contribution of arbitrary comments like "I don't know how you keep thinking them up" and "it must be getting really difficult after all this time". The fact is, writing the column is not in itself difficult; the real problems are finding the time and discovering new topics. (I must say you lot don't help too much with the latter!).

Devious
The other day I was having this kind of conversation with a client, who helped me to realise that I started this column three and a half years ago. Since then many people have moved into selling. Furthermore, a few reminders on the same topics after all this time won't do the experienced salespeople any harm either. (Incidentally I have only rewritten one article since starting out and within 48 hours of the version's appearance I had a letter on my desk pointing out the devious

Benefits
The person who buys a particular kind of car could be motivated by a variety of different influences. Company prestige, financial investment, physical security, economy, social status, excitement, tax avoidance, or even a desire to travel; but not simply the prospect of exchanging his hard earned income for a metal box on wheels. The conclusion of this thesis is simple: Do not sell the products merely on the strength of its specification and appearance; sell instead the benefits that product will bring. In other words, sell the sizzle, not the sausage.

Image
Have you ever asked yourself the simple question: "Why do people buy?" Many people, actually employed in selling have never really considered this question — surprising when you consider how fundamental it is to individual sales success. The general assumption is that people buy things for what they are; perhaps the buyers even believe the same.

Image
People buy to satisfy a need or desire. The actual product or service they obtain is merely the means whereby that requirement is fulfilled. They do not buy the object; they buy its implications, its image or the idea it promotes.

Image
In a business environment, the client's need usually takes the form of a problem that needs to be solved. Whether the client is actually aware he has a problem is a matter for the salesman to resolve early in the proceedings. A company, might, for instance, have problems relating to warehousing and distribution. The fact that the result of their deliberations is the purchase of a computer, is almost irrelevant.

Problem
What they have really bought is the means of achieving a higher level of customer service, fewer stock shortages and redundancies, faster de-

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